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Including the Proceedings of the
AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

VOLUME XIV DECEMBER 14, 1925 NUMBER 21

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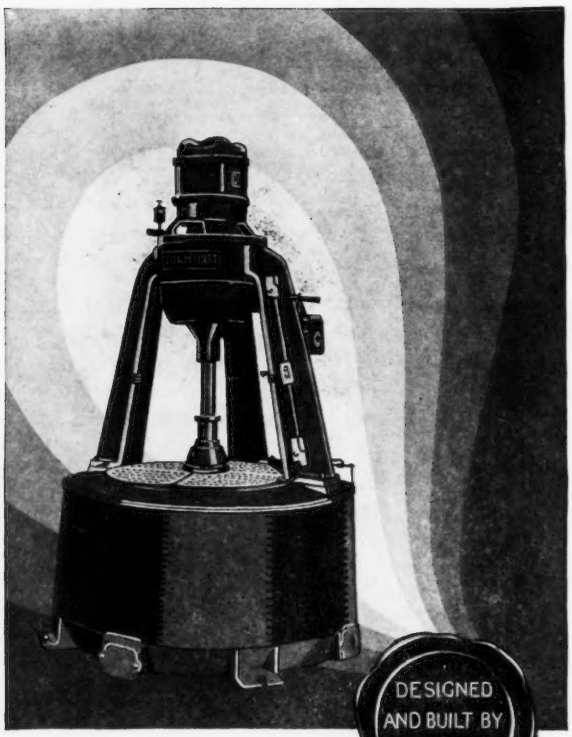

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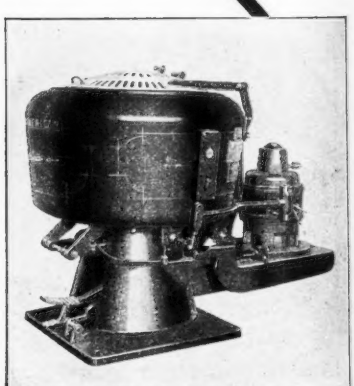

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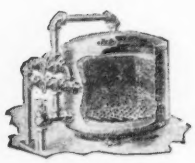

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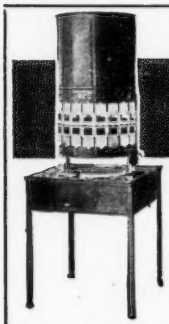

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VOLUME XIV NEW YORK, DECEMBER 14, 1925 NUMBER 21

Effect of Naphtha Sulphonic Acid on Desizing of Cotton

Removing Impurities—Experiments to Improve Cleansing Process—Testing of the Desizing Agent—Study of Results—Properties of Textile Sizes—Effect of Naphthol Sulphonic Acid in Removing Ingredients of Sizing Compounds—Removing Tallow

By PROF. P. P. VICTOROFF

(Textilberichte 1925, 333 ff.)

Abstracted by Ismar Ginsberg, B. Sc., Chem. Eng.

IN the preparation of the cotton fiber, either in the manufacture of white goods, in the printing of calicoes, or in the regular dyeing operations, it is essential that the cotton fiber be absolutely pure before it is bleached. Bleaching is, of course, necessary before the cotton can be either printed or dyed.

In general the bleaching operation is divided into two parts: The first consists in preparing the gray goods for the bleaching process and the second is the bleaching itself. The preparation of the gray goods for bleaching is in itself divided into several parts, but consists essentially in removing the impurities that are mixed with the fiber, either naturally, or artificially during the spinning and weaving process. It is essential that the removal of these impurities be accomplished as thoroughly as possible in the first part of the bleaching process, so that the consumption of bleach in the second part may be as little as possible.

This part of the process is also known as bowking, and one of the operations is to treat the cotton fabric with a solution of sodium carbonate at an elevated temperature. It is not an operation that is as easy to perform as it seems, for it is necessary not only to remove the impurities but also to avoid injurying the cotton fibers in any way while the process is being carried out. Therefore many experiments have been made with the idea of adding certain chemical reagents to the desizing of bowking liquor so as not only to increase its effectiveness but also to reduce any injurious action that it might have on the fibers.

Then again the impurities in the cotton fiber are also removed to a certain degree by steeping the cloth both in cold and in warm water, by treatment with waste liquors, with Diastofor, followed by allowing the fabric to remain in bins for a length of time, then washing with water and acidifying and again allowing the fabric to lie for a period of twenty-four hours or more. It is possible to remove in this manner approximately 45 to 65 per cent of these impurities. But while dirt, certain ingredients of the sizing compositions employed in spinning and weaving, such as dextrine, starches, glycerol, minerol oils and the like offer no great difficulty in removal, on the other hand there are certain substances which adhere very tenaciously to the textile fiber. Such substances as the fatty materials contained in the sizing compositions, lubricating oil with which the fibers become contaminated during their processing, and the fatty and waxy parts of the fibers themselves are by no means so easily removed and often require as much as an eight-hour cooking with an alkaline solution at a pressure as high as five atmospheres.

Of course, it is evident that the use of alkaline reagents and high pressures in the cleansing process has the effect of increasing the cost of the process as well as introducing the danger of injurying the fiber itself. Then again, it is found that the results are apt to be somewhat irregular, which is a decided disadvantage in the subsequent dyeing and printing operations.

Various investigations have been carried out on this subject. The entire purpose of these investigations has been to improve the cleansing process, and at the same time prevent the chemical reagents from injurying the textile fiber. The strength of the alkaline liquid has been varied, as well as the time of treatment and the pressures under which it was carried out. Experiments were also made in which bowking was

carried out without pressure. In some cases the goods were simply treated with Diastofor and the solubilized starch washed out the next day. This was, of course, applicable only to goods that were to be printed or dyed in dark shades.

It thus appears evident that the treatment that the cotton fabric receives before it is made ready for dyeing or printing varies considerably both with the uses to which the goods are to be put as well as with the nature of the printing and dyeing process itself. A number of experiments were carried out on this matter in the laboratories of the Technical High School in Moscow, Russia, and the results of these experiments have been published in Melliand's Textilberichte. A review of this work and the conclusions that were derived from it are given in this article.

Testing the Desizing Agents

Three special preparations were tested out. One of these is known as Epifasol, the second Reaktiv Petroff and the third Kontakt T. The second of these preparations was formerly employed in the splitting of fats in the soap and stearin industry, and the third is known to be composed of naphtha sulphonic acids.

In using the sulphonic acid preparation, the gray goods are treated with a one-half per cent solution of the desizing agent to which it is advisable to add approximately three-tenths of a per cent of sulphuric acid. The cloth is allowed to remain in this bath for a period of eight to twelve hours.

It is interesting to note that the naphtha sulphonic acid product is obtained as a by-product in the purification of solar oil distillates from crude oil which is treated with sulphuric acid. The oils thus obtained are dark, almost black, in color with a bluish sheen and have a sharp ester-like odor. They may be mixed in any proportion with water and when this is done a strongly foaming, clear solution is obtained. When this solution is treated with a mineral acid a thick oily layer is precipitated. Strong lyes also precipitate alkali salts from the technical preparation, and a saturated salt solution gives a grayish brown, porous mass which is insoluble in ether. The salts of the alkaline earths and heavy metals are almost insoluble in water, but easily soluble in alcohol and ether.

Various determinations were made on these desizing reagents, such as the total acid number. This is taken to be the quantity in milligrams of potassium hydroxide which is required to saturate the sulphonic acid contained in one gram of the product.

Another test made on the desizing agent was to determine the vaseline oil. For this purpose the naphtha sulphonic acid preparation was treated with water and alcohol which results in the separation of the vaseline oil.

The following tabulation gives the properties of two of the desizing agents, Reaktiv Petroff and Kontakt T.

	Reaktiv Petroff	Kontakt T
Total acid number (in milligrams)	73.547	94.977
Acid number corresponding to sulphuric acid (in milligrams)	10.702	12.032
Acid number corresponding to the naphtha sulphonic acid (in milligrams)	62.485	89.945
Per cent of naphtha sulphonic acid	39.28	51.84
Per cent of sulphuric acid	9.94	1.05
Per cent of vaseline oil	9.56	15.76
Specific gravity at 15 deg. Cent. (in milligrams)	1.0531	1.0514

The investigation was continued to determine the manner in which these desizing agents affected the impurities in the cotton cloth which was treated with them. These reagents appear to have quite a different effect on the cotton impurities, and the results obtained thereafter in dyeing the treated cotton fabric also vary considerably.

It is interestong to note the results that were obtained with the reagent Epifasol, given in the tabulation below.

These investigations were carried out with a solution of Epifasol containing 1½ per cent of the reagent. The solution was neutralized with a 25 deg. Be. solution of sodium hydroxide. The tests that were made with the reagent called Kontakt were made with a solution containing ½ per cent of the reagent.

It was also found in using the preparation Kontakt that in the first three hours of the treatment the impurities were rapidly removed from the cotton. The results obtained with Kontakt were somewhat better than those obtained with Epifasol.

The reason is to be found in the fact that the Epifasol preparation does not contain any fat-splitting ingredients, while the Kontakt preparation does. Hence the latter

TREATMENT WITH EPIFASOL	Removal of Impurities Effected, in Per Cent on Crude Wght.	Impurities Remaining, in Per Cent on Crude Wght.	Removal in All Admixed Impurities	Percentage With Total of Fats and Waxes
First hour of treatment	6.46	0.73	52	53
Second hour of treatment	7.16	0.52	57	66
Third hour of treatment	7.50	0.43	60	72
Fourth hour of treatment	7.35	0.39	59	75
Sixth hour of treatment	7.94	0.37	64	76
Eighth hour of treatment	8.20	0.42	66	73
Tenth hour of treatment	8.24	0.36	66	77

preparation has a very marked effect on the fatty ingredients of the cotton fibers, while the former has not. The net conclusion is that the Epifasol has not so energetic an action on the impurities in the cotton fibers as the Kontakt preparation.

The material, after treatment with these preparations, appears to be in very good condition. It is very soft and wets down very easily with water; but when the cotton fabrics are treated in the purification process with a 4 deg. Be. solution of caustic soda, and most emphatically when the concentration is as high as 10 deg. Be., it is noted that the samples are colored brown at parts, showing that a certain amount of oxycellulose is formed.

Tests were also made to determine the activity of these desizing agents when used in an acid solution as compared when used in a neutral solution. In the case of Epifasol it was surprising to find that its action was considerably reduced when used in an acid solution. It is known, however, that the hydrolysis of starch is enhanced by the presence of acid; but somehow in this case contrary results were obtained. The only reason that could be found for this action was that in acid solution Epifasol forms a white emulsion which does not wet down the cloth in so satisfactory a manner as the neutral solution of the desizing agent.

Tests were also made to determine the action of these desizing preparations on the different ingredients found in textile sizes. In the first place, it is instructive to divide these materials into five separate groups. In the first group will be found the thickening and adhesive ingredients, such as flour, starch, dextrine, vegetable gums, and hide or bone glue.

In the second group there are the softening agents, such as tallow, train oil, palm oil, cocoanut oil, castor oil, olive oil, wax, stearine, paraffine, curd soap, soft soap, Marseilles soap, olein soap, glycerine and mucilage.

Then, there is the class of hygroscopic substances; which are, for example, caustic soda, soda, potash, common salt, chloride of magnesium and chloride of calcium. The fourth class consists of the antiseptic substances, such as alums, copper sulphate and chloride of zinc.

The fifth class contains the loading or weighting substances; in other words, the diluents or fillers. Clay or kaolin, magnesium sulphate, heavy spar and Glauber salt may be mentioned among the numerous substances that may be used for this purpose in compounding the sizing preparation.

Of the substances that have been mentioned in the foregoing list, all that can be considered here are starch, tallow and soap, so far as the action of the naphtha sulphonic acids in the patented desizing preparations is concerned. The soap is used in the sizing composition for the purpose of emulsifying the tallow and keeping the latter in the emulsified condition. The other ingredients of the sizing composition, such as the mineral constituents and the glycerine, are easily washed out. Then, again, others, like tallow, possess the property of being split up into simpler products. Finally, there are the substances which have been found to be removed from the cotton fiber only with great difficulty. Such substances as the waxes are referred to, but fortunately these are used but seldom in the weaving and spinning process. Other substances that belong to this class are used in special cases only; as, for example, paraffine and stearine, which are employed in the sizing of bleached or colored yarns.

The tests that were made had for their purpose the determination of the effectiveness of the naphthol sulphonic acids in removing the various ingredients of the sizing compositions. For this purpose a bleached fabric was employed which was impregnated with the sizing ingredient and treated with a series of solutions of the patented sulphonic acid desizing agents.

Thus the cloth was first impregnated with a starch paste at a temperature of 70 deg. Cent. The starch paste was made with 30 grams of wheat starch and 1,000 grams of distilled water. The fabric was then dried at a temperature of 50 to 60 deg. Cent. and treated at a temperature of 55 deg. Cent. with solutions of various naphthasulphonic acid desizing preparations. Thus 0.5 per cent of Kontakt T desizing compound was used in one case, then the same proportion with the addition of 0.3 per cent sulphuric acid, then the same proportion again with the addition of sodium hydroxide until neutral. Then 1.5 per cent Epifasol with the addition of sodiuf hydroxide until neutral; then 0.2 per cent Diastofor, 0.5 per cent sodium hydroxide, 0.8 per cent sulphuric acid, and finally distilled acid. The treated cloth was subjected to the action of all these eight reagents, one after the other.

Then the samples were washed with hot and cold water, dried and tested for their starch content. To do this strips were cut from the fabric and fastened in a suitable frame and then dipped into a cold solution of iodine in potassium iodide for a period of fifteen seconds. All the samples showed that they still contained some starch, but to variant degrees.

So far as the potency of these desizing agents for removal of starch is concerned, they may be arranged in the following order. First, there is the Diastofor, which showed scarcely any trace of starch; then the Kontakt, with sulphuric acid; then caustic soda, which was almost as good a starch remover as the Kontakt preparation; then Kontakt itself; then Kontakt with neutralization with sodium hydroxide; then Epifasol; then sulphuric acid, and finally water.

A test was also made to determine the effectiveness of these desizing agents in removing tallow. For this purpose the bleached fabric was treated with an emulsion of tallow in an olein soap, made by emulsifying 3 grams of tallow in 1.5 grams of olein soap and 1 liter of distilled water. The cloth was impregnated at a temperature of 70 deg. Cent. The determination of the effectiveness of these desizing agents for removing tallow was made by establishing the ease with which the treated fabric was wetted with distilled water. Samples of the variously treated cloth were allowed to rest on the surface of cold distilled water and the time it took for the water to pene-

trate into the fabric and cause it to sink below the surface was taken as an indication of the ease with which the fabric was wetted by the water and of the comparative amount of tallow that remained in the fibers after treatment with the various desizing agents. It was found that the treatment with Kontakt and 0.3 per cent sulphuric acid gave the best results in removing the tallow. Next in order came Kontakt used alone, then Epifasol neutralized, then Kontakt neutralized, then caustic soda, then sulphuric acid, and finally distilled water. The latter did not, of course, have any action on the tallow at all, and the test was not made with Diastofor for the simple reason that this substance has no action on tallow.

The conclusions that can be drawn from this study are as follows: In the first place it has been seen that the preparations of naphtha sulphonic acids, known under the trade names of Kontakt and Epifasol, are desizing agents which are able to remove effectively the starchy ingredients of the various sizes used in textile practice. The Kontakt desizing agent works better when it has been acidified with sulphuric acid and gives better results under the same conditions than a neutral solution of Epifasol.

It was also found that Kontakt is a good agent for removing the fatty matters in the size. The Epifasol is not a fat splitter, but due to the fact that it forms an emulsion rather easily it is able to remove the fatty and waxy ingredients of the size and of the neutral fiber as well from the fabric.

It was also found advantageous to soften the fabric first by digestion with various reagents before subjecting it to the action of the desizing preparations. The use of caustic soda at a temperature of 55 deg. Cent. was found to be best suited for this purpose.

Supplying Russian Factories With Dyes and Chemicals

By P. Islentieff, Chem. Eng.

From the Review of the Textile Trade and Industry, No. 10, page 3, March, 1925, Moscow, U. S. S. R.

[Editor's Note.—The following translation of an article that appeared in a Russian textile publication is interesting because of the insight it affords into the close co-operation prevailing in the Russian textile and dyestuff trades. It tells of the methods employed by the All-Union Textile Syndicate in fostering relations of mutual advantage to all members of the dye and chemical consuming trades.]

IN pre-war times there was no fear of a shortage of any dyestuffs or chemicals that could not easily be replenished. It was only a matter of time, so that all a technical manager of a textile factory had to do was to watch his own stocks closely and to replenish them as need arrived. If he took any interest in the chemical market it was merely in order to keep in touch with any new lines which might appear and be of interest to his business. At the present time, however, the problem of supplies is a more difficult one. The technical manager must, when planning his future program of production, take into consideration (a) his own stocks, (b) the supplies obtainable at the market, and (c) the amount of raw materials in the hands of the producing concerns supplying the market. The work of the distributing department of the All-Union Textile Syndicate, which is supplying the whole of the textile industry, is of a complex nature. The distributing department must at all times be thoroughly acquainted with the conditions prevailing on the market, not only as to the quantity and quality of supplies available, but also as to the source of production of each article. It must in the course of things, with regard to factory consumption, know what stuffs can successfully be substituted by others, and see that those products which are obtainable only in limited quantities, are equally distributed among the consuming factories. All these problems can be successfully solved only on condition of full co-operation between the parties concerned. With this end in view it is necessary to make a practice of meeting periodically at the offices of the A-U. T. S., where representatives of the distributing department of the A-U. T. S. could meet those of the distributing departments of separate trusts and of the dyeing departments of textile factories, and find means and ways and best methods of supplying the industry. At these meetings where producers, distributers and consumers would all be brought together, all the important questions relating to supplies could be discussed and decided to mutual advantage. Thus it could be decided which dyes should be produced locally and which should be imported from abroad. By inviting to these meetings the technical staff of factories information could be obtained with regard to practical working and results of certain chemicals, dyes and substitutes. There are many other matters of vital importance to the dyeing section of our textile industry which could be discussed at these meetings to the advantage of everyone concerned.

ON NEUTRALIZING CHLORINE

Quite frequently samples of a so-called chlorine neutralizer are received at our laboratory.

As a rule, these are mixtures of sodium bisulphite and soda ash, or preferably sodium bisulphite mixed with one of the acid fluoride sours. The sodium bisulphite acts as a reducing agent or a reducing bleach, but unfortunately most of the bleaching action done with reducing agents is merely temporary. By exposure to the air gradual oxidization reproduces the stain.

There is a possibility of separation of sulphur from the bisulphite by sour. Precipitation of sulphur in the goods will promote dark colors and fast stains.

A third factor which is undesirable is that these chlorine neutralizing materials are frequently used after the suds baths. The hard rinsing soda ash is thus carried on through the last rinse, unless an excess of sour is used to neutralize it. Certain of the chlorine neutralizers on the market have been found to contain considerable sulphuric acid in the form of the solid nitre cake. Sulphuric acid in any form should be diligently avoided in laundry practice.—Cowles Detergent Co. Bulletin.

Capitalizing on Color

Color Harmony Service—A Sales Producing Opportunity for the Dye Industry

By Hazel H. Adler

Director of the Taylor System of Color Harmony, Inc.

THE affiliation of interest between the dye and textile industries is steadily becoming more and more obvious. Color being the basic commodity of the dye industry and the predominating factor to-day in textile manufacture and sales, the mutual benefit of close co-operation which was always present, is becoming a practical necessity. This is due to the undisputed sway of color in the field of fashion, and the introduction into the dyeing and textile industry of a new textile and dye problem—rayon.

The responsibility for color selection and color combination has hitherto always been assumed by the textile industry. The job of the dyer was to carry out as nearly as possible the demands and requirements of his customers. The textile manufacturer in the great majority of cases appreciated neither the technical difficulties nor possibilities of dyeing; while on the other hand the dye manufacturer or dyer offered nothing to the textile problems of color selection, color combination or styling.

Color to-day, as far as the dye industry is concerned, has been robbed of its mystery through its momentous technical progress during the last ten or twelve years. Simultaneously, there has come a revelation of the equally mystifying secrets of color combination.

The creation of distinctive, harmonious and versatile color combinations is no longer limited to the exclusive province of the artist or designer. The laws underlying color harmony are as accessible and exact as those underlying color chemistry.

Color harmony law was the discovery of the late Henry Fitch Taylor, one of our foremost American artists. It is embodied in a color harmony keyboard, and the system and the keyboard both named after their inventor, Mr. Taylor.

The Taylor Color Harmony Keyboard brings instantly before the eye many thousands of harmonious color combinations of from two to seven colors in full tones, tints, neutrals and blends. The harmonies are viewed through a mask with cut-out windows applied to carefully graded scales of color. The colors appearing through the openings of the mask are always in harmony no matter where the mask is placed upon the color scales. Through the use of sliding shutters, each color combination can be viewed in various values and neutralizations.

The principle underlying Mr. Taylor's discovery is based on a mathematical relation of intervals in the twelve-tone chromatic scale of color. Quite by accident Mr. Taylor discovered that the same relation of intervals which bring about harmonious combinations of sound provide equally harmonious combinations of color.

The contribution of the Taylor System of Color Harmony to color science is revolutionizing. Practically the only information available on color harmony, prior to the Taylor keyboard, was the law of complementary color harmony. The older systems were in the form of a wheel which were limited to two-color combinations, while the new system harmonizes as many as eight colors in one combination and provides a wide choice of harmonies for each color in the spectrum.

To show how the color keyboard may be practically used for the selection of a harmonious color combination for a textile design, let us suppose it is desired to find colors which harmonize with a particular tone of yellow. The first opening in the mask is placed over a similar tone of yellow, as it appears in the color keyboard, and the following colors will simultaneously show through the other two openings: green-blue and violet red. With these three colors to work upon, the pattern, weave or design of the material can readily be visualized in the color combination.

But suppose the particular combination revealed does not happen to suit or please. In that event, the second opening of the mask is placed over the yellow in question, and instantly two other colors which are harmonious, but different from the first two, appear through the first and third window. If this combination is unsatisfactory, too, still other combinations may be produced by the application of other windows in the mask of the key color.

The carefully graded scales of hues and values enable one to find a close approximation for every popular trade color. The general purpose of the keyboard, however, is not that of a color standard for matching shades, although it is used in this capacity by many textile manufacturers. The direct aim is to afford the layman, artist or student a means of accurately and quickly building up harmonious and distinctive combinations on a wide range of foundation colors. The harmonies on the keyboard are insured—by the eye and by corroboration with all known color laws.

To-day there are few representative textile manufacturers who are not equipped with a Taylor Color Harmony Keyboard, but the great inspirational and practical value of its use upon their color problems lies in the hands of the dyers. Difficulties and obstacles are opposed until frequently the manufacturer is forced to abandon the new and scientific method of color selection for the old, crude, hit or miss way.

There is no artistic or salable color combination which a dyer cannot obtain if a conscientious trial is made The dyestuff manufacturers are ready to help him. Naturally, however, it is easier to take the line of least resistance and try to sell service in which there is no need of research or experimentation.

Harmonious and salable color combinations should be of as much interest to the dye industry pocketbook as it is to that of the textile industry. Future developments are largely dependent in American textile progress on the willingness of the dyer to co-operate and experiment with the textile manufacturer.

There is no progressive textile manufacturer who would not enthusiastically welcome practical and inspirational service on color selection and combination from his dyer.

And there are no obstacles in the way of the dyer or dyestuff manufacturer in providing such a service. Scientific knowledge as well as a wealth of practical information on the subject is available.

WASHING FORMULAS FOR SILK DISCUSSED BY SILK ASSOCIATION COMMITTEE

Submission of a tentative formula for washing silk fabrics was made by each of five members of the Committee on Washing Silk Fabrics at their recent meeting at the Silk Association of America rooms.

Discussion of the comparative merits of each formula was based on questions involving the degree the fabric was soiled, the length of time it should remain in the water, temperature of water, concentration of soap, mechanical manipulation, rinsing method, drying method, iron temperature, and the number of washings a fabric may be expected to survive.

It was determined that the washing formula to be drawn up eventually for the benefit of both laundry and housewife must limit itself to apply only to silks definitely sold as washable. The committee also touched upon what washing practices were to be considered as definitely unsatisfactory.

The committee judges its proposed work of such permanent significance as to require still further research and expert judgment. Dr. W. F. Edwards, of the United States Testing Company, Inc., is chairman; other members are Frank D. Cheney, of Cheney Bros.; Harry T. Rounds, of Sussex Print Works; Ernest Cadgene, of Lyons Piece Dye Works, and Ernest J. Ruegg, of Schwarzenbach, Huber & Co.

NORTH CAROLINA TEXTILE SCHOOL ADDITION

J. E. Sirrine & Co., of Greenville, S. C., have prepared plans for an eighty-foot addition to the Textile Building of the North Carolina State College, Raleigh, N. C. The contract has been awarded to Gallivan & Co., of Greenville, S. C., and construction will begin immediately. When completed, the building will be 75 by 230 feet, three stories high. A complete heating, lighting and sprinkler system will be installed in the entire building.

There will be $100,000 expended on enlarging the building and purchasing additional equipment. When this expansion is completed, the value of the Textile Building and equipment will be approximately a quarter of a million dollars.

The new building will contain an experimental department which will be operated as a separate unit. The equipment will be specially selected and will contain the latest types of machinery obtainable. In connection with this experimental department, a research laboratory will be maintained in which there will be all the necessary apparatus for the testing of raw materials, yarns and fabrics. This departmetn will devote its entire time to a systematic study of problems confronting the textile industry.

RIGID EXAMINATION FOR APPLICANTS FOR CHEMICAL DIVISION CHIEF

The position of chief of the Chemical Division of the Bureau of Standards of the Department of Commerce has been declared vacant by the United States Civil Service Commission. In view of the importance of the position in the whole field of chemical research, and to insure the appointment of a thoroughly qualified man for the work, an unusual method of competition will be followed to fill the vacancy. Instead of the usual form of Civil Service examination, the qualifications of candidates will be passed upon by a special board of examiners, composed of Dr. George K. Burgess, director of the Bureau of Standards; Dr. F. G. Cottrell, director of the Fixed Nitrogen Research Laboratory of the Department of Agriculture; Dr. W. A. Noyes, dean of chemistry of the University of Illinois; Dr. W. Rr. Whitney, chief of the research laboratory of the General Electric Company, and Frederick W. Brown, examiner of the United States Civil Service Commission. For the purpose of this examination all of these men will be examiners of the Civil Service Commission.

The examination will consist solely of a consideration of qualifications by this special board. The minimum qualifications for consideration are a doctor's degree in chemistry from a college or university of recognized standing, and at least ten years' experience in the direction and performance of chemical research of a character to show the required degree of chemical knowledge and ability, executive capacity of the highest order, thorough familiarity with chemical literature, and scientific maturity.

LOWELL TEXTILE INCREASES MACHINERY

Through the courtesy of the Merrow Machine Company the equipment of Merrow sewing machines at the Lowell Textile School has been completely replaced.

The replaced equipment consisted of five machines of the following types: 60S, 60D, 60AD, 15F, 35FS. The new machines have been selected with the day's needs in mind and include types 60S, 60Q, 60UD, 60WD, 35FJT.

This new equipment gives a fine collection of overseaming and shell stitching machines, with which to manufacture hosiery, underwear and outerwear.

In addition to this new equipment the knitting department has three Singer and five Union Special sewing machines.

The Reduction Products of Azo Dyes

Part VI

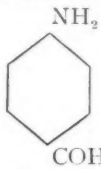
By WALTER C. HOLMES

Color Laboratory, Bureau of Chemistry

[EDITOR'S NOTE.—*The most practical and effective method for the identification of azo dyes consists in the isolation and identification of the products which they yield on reduction. This method finds less application than it might or should, partly because some of these products have never been isolated and investigated, and partly because much of the data which has been obtained in regard to such reduction products is greatly scattered and very difficult to locate.*

Mr. Holmes has made a search for all the available information on such reduction products, and this series contains a digest of his results with a systematic listing of the reduction products of the azo dyes published in the Colour Index, together with the available data on such properties and reactions as would be of service in their identification.]

No. 55.—p-AMINOBENZALDEHYDE



C_7H_7NO; Mol. Wt. 121.1; (C, 69.4%; H, 5.8%; N, 11.6%; O, 13.2%).

Derived from C. I. No. 124.

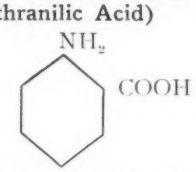
Flat serrated leaflets, very slightly sol. in H_2O. Mpt. 71°. Readily polymerizes to a yellow insol. product which does not melt below 100°.

Hydrochloride, reddish cryst. which undergo partial hydrolysis with H_2O.

Acetyl deriv., long glistening needles (hot H_2O), mpt. 154-5°. On boiling the acetyl deriv. with acetic anhydride *p-acetaminobenzaldiacetate* is obtained, colorless cryst., mpt. 166°, sol. in alc. and difficultly sol. in cold ether.

The dye obtained by diazotization and coupling with β-naphthol crystallizes in compact needles (Ac HO), melts at 183° and dissolves in H_2SO_4 with a violet color.

No. 56.—o-AMINO BENZOIC ACID (Anthranilic Acid)



$C_7H_7NO_2$; Mol. Wt. 137.1; (C, 61.3%; H, 5.1%; N, 10.2%; O, 23.3%).

Derived from C. I. Nos. 211 to 216.

Leaflets or trim. cryst., with characteristic sweet taste, melting at 144-5°. .519 part sol. in 100 cc. H_2O at 25°, 10.7 parts in alc. at 9° and 16 parts in ether at 7°. Sublimes in vacuo, is slightly vol. with steam and is decomp. by boiling H_2O, yielding aniline. Sols. fluoresce blue.

Hydrochloride, needles, mpt. 191°; *sulfate* (+2H_2O), needles, mpt. 188°.

Acetyl deriv., long, flat rhombic needles (Ac HO), mpt. 185°; *diacetyl deriv.,* colorless cryst., mpt. 220°; *benzoyl deriv.,* long needles (alc.), mpt. 181°.

With *sym. trinitrobenzene* it forms an additive product, orange-red needles, mpt. 192-3° (cor.), and its K salt a corresp. product, deep-red needles, mpt. 114° (cor.) (Sudborough & Beard). The former comp. is given as orange-yellow needles, mpt. 186-7° by Ostromisslenski.

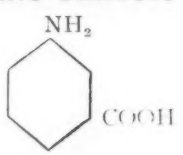
Condensation products.—With chloracetone (and K_2CO_3) *acetonyl-anthranilic acid,* mpt. 169-70°; with sulfuryl chloride, *2-amino-3, 5-dichlorbenzoic acid,* mpt. 223° (acetyl deriv., mpt. 278°); with chloracetic acid, *phenylglycine carboxylic acid;* with phenacyl bromide, the *phenacyl ester,* mpt. 181-2°; with benzene sulfochloride, *N-phenylsulfon-anthranilic acid,* mpt. 214-5°; with o-nitrobenzaldehyde, brick-red, mpt. 167-8° (with m-isomer, yellow, mpt. 198-200°; with p-isomer, colorless, mpt. 165-7°); with sym. trintrobenzaldehyde, *2, 4, 6-trinitrobenzal-o-aminobenzoic acid,* mpt. 146°; with 1, 3, 4, 6-bromtrinitrobenzene, *5-brom-2, 4-dinitrodiphenyl-amine-2'-carboxylic acid,* garnet-red prisms, mpt. 274-6°; with γ-trinitrotoluene, the 5-methyl isomer of the last, red-yellow cryst., mpt. 244-5°.

Diazotized and coupled with—*β-naphthol,* red cryst. (Ac HO), mpt. 276°, wine-red sol. in H_2SO_4, orange-red pptte. on dil.; with *Naphthol AS,* orange-red cryst. (Ac HO), mpt. 310°, wine-red sol. in H_2SO_4, yellow-red pptte. on dil.

Heated with HNO_3 anthranilic acid yields picric acid; with HNO_2 it gives salicylic acid ($FeCl_3$ test).

(For further differentiation see Ber. *44,* 3306.)

No. 57.—m-AMINO BENZOIC ACID



$C_7H_7NO_2$; Mol. Wt. 137.1; (C, 61.3%; H, 5.1%; N, 10.2%; O, 23.3%).

Derived from C. I. Nos. 217, 218, 349 and 607.

Reddish cryst. warts with sweet taste melting at 174°. D. 1.5104 at 4°; .67 part sol. in 100 cc. H_2O at 20°; 1.81 in ether at 6°; 2.92 in alc. at 12°. Sublimes, in part undecomp. Is stable in boiling H_2O and is not volatile with steam.

Hydrochloride, mod. sol. in H_2O and alc., sl. sol. in HCl. (prisms).

Sulfate (+H_2O), needles, sl. sol. in cold H_2O, mpt. 225° (anhyd., 230°).

Ba salt (+4H_2O), difficultly sol. in H_2O.

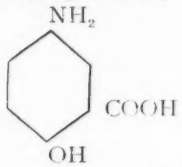
Acetyl deriv., micr. needles, mpt. 248° with evolution of gas (sublimes).

Condensation product.—With o-nitrobenzaldehyde, col-

orless, mpt. 220-2°; with m-nitrobenzaldehyde, white, mpt. 260-2°; with p-nitrobenzaldehyde, yellow, mpt. 246-7°; with γ-trinitrotoluene, 2-4-dinitro-5-methyldiphenylamine-3'-carboxylic acid, yellow prisms, mpt. 247-8°; with 1, 3, 4, 6-bromtrinitrobenzene, the 5-brom isomer of the foregoing, red-yellow needles, mpt. 245°. With p-nitrobenzyl chloride it gives a yellow ester, mpt. 198°.

(For further differentiation see Ber. *44*, 3306.)

No. 58.—5-AMINO-2-HYDROXYBENZOIC ACID (Amino Salicylic Acid)



$C_7H_7NO_3$; Mol. Wt. 153.1; (C, 54.9%; H, 4.6%; N, 9.1%; O, 31.4%).

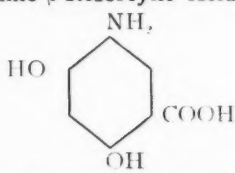
Derived from C. I. Nos. 40, 52, 67, 109, 110, 112, 122, 157, 195, 197, 213, 218, 219, 223, 229, 274, 299, 302, 303, 340 to 343, 346, 366, 409, 410, 412 to 426, 431 (432, 433), 441, 445, 478 (note), 479, 480, 488, 531, 555 to 561, 570, 584, 585, 587, 594 to 599, 601, (603), 614, 615, 618 and 653.

Glittering needles, sparingly sol. in H_2O (sol. in dil. alkalies). Turns brown in air. At about 280° it decomp. with evolution of CO_2 and formation of p-aminophenol (the latter gives benzoquinone on acid oxidation). The free base gives a blood-red color with $FeCl_3$ in ether or benzene. Does *not* yield nitrogen when heated with nitrous acid.

Hydrochloride, long, colorless needles, only sparingly sol. with excess HCl; *Sulfate*, prisms, mpt. 334°.

Acetyl deriv., massive colorless cryst. ($\frac{1}{2}H_2O$), mpt. 218°., sol. in H_2O, alc. and Ac HO; *benzoyl deriv.*, amorphous powder ($CHCl_3$), mpt. 252°, only sl. sol. in hot H_2O.

No. 59.—5-AMINO-2, 4-DIHYDROXY BENZOIC ACID (Amino-β-Resorcylic Acid)



$C_7H_7NO_4$; Mol. Wt. 169.1; (C, 49.7%; H, 4.2%; N, 8.3%; O, 37.8%).

Derived from C. I. No. 41.

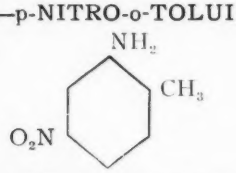
Prisms, mpt. 193°, difficultly sol. in Ac HO and hot H_2O, readily sol. in KOH and HNO_3 sols.

The *hydrochloride* is more sol. than the free acid.

Blue-green cryst., mpt. 212-3°.

Sulfate, white needles, mpt. 226°, readily decomp. by H_2O.

No. 60.—p-NITRO-o-TOLUIDINE



$C_7H_8N_2O_2$; Mol. Wt. 152.12; (C, 55.2%; H, 5.3%; N, 18.4%; O, 21.0%).

Derived from C. I. 68 by partial reduction.

Orange prisms with intensely sweet taste. Mpt. 107°, bpt. about 310°. Dissolves in 100 parts boiling H_2O and is sl. volatile with steam.

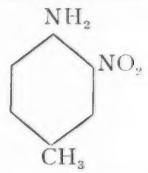
Acetyl deriv., yellowish needles, mpt. 150-1°.

Salts with: *Benzenemonosulfonic acid*, mpt. 222°, 100 gm. aq. sol. cont. 1.84 gm. salt at 15°; *α-naphthalene sulfonic acid*, mpt. 244°, 100 gm. aq. sol. cont. .11 gm. salt at 15°; *β-naphthalene sulfonic acid*, mpt. 229-30°, 100 gm. aq. sol. cont. .12 gm. at 15°; *1, 8-diaminonaphthalene-3, 6-disulfonic acid*, mpt. 270° (decomp.), .186 part salt sol. in 100 H_2O at room temp.; *H-acid*, gray prisms, mpt. 269° (decomp.), .106 part salt sol. in 100 H_2O at room temp.

Diazotized and coupled with: *β-naphthol*, long red brown needles (Ac HO), mpt. 206°, magenta-red sol. in H_2SO_4, orange-red pptte. on dil.; *Naphthol AS*, red needles with green reflex (Ac HO), mpt. 304°, red sol. in H_2SO_4, yellow-red pptte. on dil.

With iodine monochloride (Ac HO) it gives 4-nitro-5-iodo-o-toluidine, yellow prisms (alc.), mpt. 109°.

No. 61.—m-NITRO-p-TOLUIDINE



$C_7H_8N_2O_2$; Mol. Wt. 152.12; (C, 55.2%; H, 5.3%; N, 18.4%; O, 21.0%).

Derived from C. I. Nos. 67, 69 and 70.

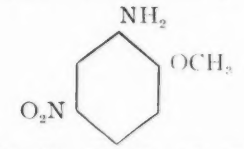
Small red prisms (alc.). Mpt. given variously, 114-118°. Very difficultly sol. in hot H_2O, readily in alc. Volatile with steam.

Acetyl deriv., yellow needles, mpt. 94-6°, very slightly sol. in H_2O, mod. sol. in alc. *Diacetyl deriv.*, massive citron-yellow prisms, mpt. 78°.

Diazotized and coupled with: *β-naphthol*, long red needles (Ac HO), mpt. 278°, violet sol. in H_2SO_4, red pptte. on dil.; *Naphthol AS*, red-brown needles (Ac HO), mpt. 284°, wine-red sol. in H_2SO_4, red pptte on dil.

With iodine monochloride (Ac HO) it gives 3-nitro-5-iodo-p-toluidine, golden brown needles (alc.), mpt. 98°. The acetyl deriv., colorless needles (alc.) melts at 202-3°.

No. 62—3-AMINO-4-METHOXY NITROBENZENE (4-Nitro-2-Anisidine)



$C_7H_8N_2O_3$; Mol. Wt. 168.12; (C, 50.0%; H, 4.8%; N, 16.7%; O, 28.6%).

Derived from C. I. No. 118 by partial reduction.

Garnet-red needles (or orange-red). Sol. in cold 40% H_2SO_4. Readily sol. in hot alc. or ether. Mpt. 118°.

Hydrochloride, prismatic needles, sl. sol. in cold H_2O, readily in hot H_2O.

Acetyl deriv., white needles, sol. in boiling H_2O, mpt. 174-5°.

Diazotized and coupled with: *β-naphthol*, red plates (toluene), mpt. 252°, magenta-red sol. in conc. H_2SO_4, orange-red sol. on dil.; *Naphthol AS*, small dark red

(*Continued on page* 840)

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

President
LOUIS A. OLNEY
Lowell Textile School, Lowell, Mass.

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FIFTH ANNUAL MEETING

The Fifth Annual Meeting of the American Association of Textile Chemists and Colorists opened Friday morning, December 4, with the registration of attending members and guests at the Copley Plaza, Boston. The entire program of the meeting covered two busy days—trips to points of interest on Friday, a buffet lunch, smoker, Open Forum and entertainment Friday evening, a business session and two well-attended technical sessions on Saturday, December 5, in the Walker Memorial of the Massachusetts Institute of Technology—and closed Saturday evening with an impressive banquet in the great hall of the Walker Memorial.

Nearly one hundred members, filling three motor buses, made up the party that visited various educational and industrial establishments on Friday. One group spent a very interesting hour in the morning inspecting the laboratories of A. D. Little, Inc., in Cambridge. The other group visited the Lowell Textile School and saw there what is being done in the education of our next generation of textile men. The two groups met for lunch in the cafeteria of the Pacific Mills, Lawrence, Mass. In the afternoon the entire party was taken through the many and various departments of the Pacific Mills Print Works. It then visited the Arlington Mills, near by, where it was able to follow the processing of wool, from the handling, sorting, grading and scouring of the raw stock through the carding and spinning operations.

To those who had arranged this feature of the program it was more than gratifying to see the very keen interest shown by all members of the party during its instructive tour of these scientific, educational and industrial establishments.

The buffet lunch in the Swiss Room of the Copley Plaza, Friday evening, was well attended. The Open Forum, with Prof. L. A. Olney, president of the Association, and E. H. Killheffer, vice-president, presiding, proved to be a novel and successful feature. This Forum had been included in the program as an experiment of somewhat uncertain result; but the lively discussion of a number of different subjects has assured it a permanent place on the programs of all future meetings. The Friday evening session was concluded with some excellent entertainment and refreshments.

BUSINESS AND TECHNICAL SESSIONS

The annual business session of the Association was held Saturday morning in the Walker Memorial Building, Massachusetts Institute of Technology. The retiring officers—Prof. L. A. Olney, president; William D. Livermore and E. H. Killheffer, vice-presidents; Walter E. Hadley, secretary, and Winthrop C. Durfee, treasurer—were re-elected. The two retiring Councilors—Walter M. Scott and William R. Moorhouse—were also re-elected.

The secretary, the treasurer and chairmen of the

various subcommittees then presented their annual reports. The technical session that followed, with an estimated attendance of 350, was opened by the presentation of papers reviewing and explaining in detail certain phases of the work that has been conducted by the Research Committee of the Association. The papers in this group included: "Action of Alkalies on Wool: Importance of pH," by H. C. Chapin; "Analytical Studies of Weight Losses of Artificial Silk, with Alkalies," by A. K. Johnson; "Study of Hygroscopic Nature of Artificial Silk," by A. K. Johnson. These were illustrated with lantern slides of charts and tables.

The presentation of the three following technical papers concluded the Saturday morning session: "Hydrogen Ion Concentration," by Walter M. Scott; "Suggestions for a Simple Standard for Testing the Fastness of Dyed Materials to Light," by William F. Deady; "A New Lamp for Fading Textiles," by William D. Appel. In connection with the last two papers a highly interesting display of the dyed samples used in the fading tests was on exhibition in the meeting room.

After a lunch in the dining hall of the Walker Memorial the technical session was resumed and the following papers presented:

"Water-proofing Textile Fabrics," by Herbert Pearson.

"The Dyeing of Acetate Silk," by H. R. Davies.

"The Application of Vat Dyes to Rayon," by Floyd Warshaw.

"Developments in the Naphthol AS Series," by H. E. Hager and W. R. Marsson.

"Oiling of Cotton Preliminary to Spinning," by Everett H. Hinckley.

"Various Phases of the Cotton Oiling Process and Its Relation to Finishing," by Richard B. Earle.

"The Dyeing of Viscose Rayon with Mordant Dyes," by W. C. Durfee.

"The Dyeing of Silk White Effects Upon Woolens and Worsteds," by Alan A. Claflin.

The Fifth Annual Banquet was held Saturday evening in the lofty dining hall of the Walker Memorial. During the dinner a program of unusually good music was rendered by the orchestra of the Massachusetts Institute of Technology. Alan A. Claflin presided as toastmaster and in a most entertaining manner introduced each speaker. The speakers of the evening included the following: Dr. E. B. Millard, professor of chemistry, Massachusetts Institute of Technology; F. Wright Fabyan, of Bliss-Fabyan & Co.; Fraser Moffat, president of the Tanners' Council; Franklin W. Hobbs, vice-president, National Association of Wool Manufacturers; Dr. Grinnell Jones, professor of Industrial Chemistry, Havard University, and Dr. Edwin Slosson, author of "Creative Chemistry."

The papers presented at the technical sessions will be published in the next issue of the Proceedings. Following is the report of the Open Forum held Friday evening:

FRIDAY EVENING SESSION

The first session of the Fifth Annual Meeting of the American Association of Textile Chemists and Colorists convened at 7:30 P. M. in the Swiss Room, Copley Plaza Hotel, Boston, Mass., Professor Louis A. Olney, president, presiding.

President Olney—Through the courtesy of the Victor Talking Machine Company we have this very fine instrument here this evening. It is not brought here as an advertising proposition at all, but because these people believe they really have a wonderful instrument, and they have been so kind as to send J. A. Frye, their representative, to play two special records for us and to say a few words in regard to the instrument. Mr. Frye! (Applause.)

. . . Mr. Frye explained the machine and its accomplishments, and played two records: "The Soldiers' Chorus" from Faust, and "Cecilia." . . . (Applause.)

President Olney—We believe that in placing upon our program this evening an open forum we are introducing something of an innovation. It is certainly an innovation as far as our Association is concerned, and at the same time a decided experiment. Whether the experiment is a success or not will depend entirely upon the response we receive from the floor.

The replies to questionnaires sent out last spring indicated that a considerable number of the members thought that more time should be allotted for the discussion of various subjects.

In making up the program for our meeting we found that there were not enough papers promised to warrant the devotion of two entire days to the technical portion, but enough to make a very full program for one day, perhaps altogether too full; so it is hoped that this opportunity for discussion will to some extent relieve tomorrow's tension.

No special attempt has been made to secure anyone in particular to speak upon any of the subjects printed upon the program, it having been thought better to have the Open Forum spontaneous as far as possible.

The subjects on the program are simply suggestions and therefore need not be followed; we shall be glad to give precedence to any other subjects that may be considered of more importance or greater interest. In fact, we want every member to feel free to introduce or suggest any subject that he may feel inclined to speak upon himself or may wish anyone else to discuss.

Please remember that I am here simply to keep the discussion in active progress, if possible, and not to answer

questions, or make any extended remarks upon any particular subject. I shall, therefore, depend upon all of you to do your part toward making this a success by offering to answer questions when able to do so. Unless you do, I may be obliged to resort to the draft law.

In looking over these subjects, the second one, perhaps more than any other, appears to be of considerable interest. I would like to say, incidentally, that our honorable Vice-President, Dr. Killheffer, is here to help me out in connection with this Open Forum, and we shall expect to hear from him quite a little before the evening is over. I am not going to attempt to handle the whole thing alone and neither of us will make extended remarks upon any subject.

The Cause of Scratching of Copper Rolls During the Printing Process

With regard to this second subject, I believe that difficulty is sometimes met in printing of vat dyes where strongly alkaline pastes are used, through the development of fine scratches on the rolls. In many instances I believe the printers, instead of studying into these causes, have simply thrown the paste away and started over again. But some investigation has been made, and one explanation is that in the space between the doctor blade and the roll there crystallizes out very fine crystals of sodium chloride or perhaps some other chemical, and these crystals being comparatively hard cause the scratches.

This subject has been suggested by several people who have been particularly interested and we would like to hear from anyone who has any information or who has had any experience along this line.

Alfred L. Lustig—This subject is very interesting. We, like everybody else, have had a great deal of trouble in vat colors. This is a condition we would find: A certain color coming into the plant would cause scratches when we would run it. Upon examining the color we would find, perhaps, it contained some fine crystalline bodies. If we prepared the color itself a little bit more carefully, we would get better results. By preparing it still more carefully we would get still better results. Therefore, I think there is very little chemical action in most cases as far as vat colors go.

We are running a great many vat colors, and it is simply a question of how carefully the colors are prepared, how carefully our thickening is prepared, and how well the sulphide solution is made; that is, so as to have no crystals in the color. Occasionally, when you have a very concentrated color, you may have to warm it up slightly, but I can't quite see where separation under the doctor comes in.

I wonder if any of the other gentlemen have had different experiences with that trouble?

President Olney—I might say in this connection that I have here a copy of the journal of the Society of Dyers and Colourists in which I saw just a few words about this subject.

The theory in regard to the separation of the crystals is proposed by Mr. Parker, of Bolton, in the January, 1924, issue of the Journal. There is perhaps two-thirds of a column with regard to that.

Did you ever investigate the nature of these crystals?

Mr. Lustig—Our opinion was this: that the colors were not in proper condition, to begin with; that in the past few years some of our makers of vat colors, particularly our domestic makers, have improved the mechanical conditions so much that we have practically no trouble now from that source, if the color is given half a chance in the making.

I remember that Indanthrene Violet, particularly before the war, and during the war, of course, caused a great deal of trouble; perhaps some of the gentlemen here who handled that dye will remember that it was one of the most troublesome to use. But that was not because of crystallization; it was because of poor colors, to begin with. The printers, perhaps, don't have time to investigate their materials thoroughly enough; you blame the dyestuff or you blame some chemical for a good many things that are happening to the colors when in reality it is merely a lack of opportunity to investigate carefully and to make the colors properly.

Some of our friends on the other side, and possibly some here, take their finished colors and put them through a very fine grinder, a lithographic mill practically, a steel mill with a little oscillating motion. In that way they avoid getting any color into the printing machines at all, and they are getting results by preparing in that way.

President Olney—I suppose, Dr. Killheffer, you are glad to hear that the American colors are improving all the time.

Mr. Lustig—I should say that they are better than the European colors in that respect.

President Olney—I suppose you are glad to hear that, too, are'nt you?

Dr. Killheffer—Oh, yes! (Laughter.) I was interested in the statement which somebody made that when the colors were a little gritty, they threw them out and started fresh. (Laughter.)

President Olney—Does anyone else wish to make any remarks on this subject?

Walter C. Durfee—It might be interesting to know that this same problem confronts the makers of astronomical lenses, and things like that. They don't have any dyestuffs, but they get a lot of grit from the ceiling. If they did not cover their ceiling with paper, they would get a great many scratches on the glass lenses.

President Olney—Are there any remarks on this subject?

Arthur Thompson—The president spoke of that theory

in which the salts crystallize between the doctor blade and the copper roll. That is particularly true, I believe, when the salts become anhydrous and very hard; then they might possibly cause a little scratching.

There are two other theories which you can accept or which you can think about, at least. One is that when grit gets into the printing paste, either from a cement floor or from some other source, it will cause a scratching of the soft copper roll. The way to avoid that would be to prevent any sweeping up, particularly if there are concrete or cement floors.

One other theory, perhaps a little more technical in its nature, is the electrolytic theory. As you know, the printing paste is a very fine electrolyte and the copper roll and the steel doctor blade serve as two very fine poles; there is a little polarity set up in the paste, and that may cause the plating out of the copper on the steel blade, or it may go in the other direction. I don't think, however, there would be any great cause for scratching there, unless there was a leak from a direct current motor which would cause one metal to pile up upon the other, and that might lift the doctor blade up from the copper roll and cause a blur or smear on the printed fabric. If you think it is due to that cause, the best thing to do is to see if you have any leaks in your direct current motors. If you aren't using direct current motors, that throws the theory off entirely.

Personally, I believe the grit theory of picking up from the air or from the floor is the best one, with the possible exception that there may be some grit in the dyestuff due to the fact that it has been ground in a pebble mill and there is flint, or one thing or another, in there which will pass through the very fine muslin cloths used to filter the paste. If they do pass through the filter cloths, they will certainly cause scratching, if run for any length of time.

Mr. Lustig—Mr. President, I would like to add one more word: Sand has been mentioned, coming from concrete. There is also danger of getting it from the water in your plant; it attaches to the cloth. If you will go back of a printing machine and examine the lint accumulated on the bars, you will find a great deal of sand there. If that sand gets into the color, you will have trouble.

I agree with the previous speaker with reference to what he said about concrete floors. We were discussing that subject to-day. That will happen. Of course, that can be overcome in various ways.

Regarding this electrolytic action, I presume that acts only in an acid medium, is that so?

Mr. Thompson—Not necessarily.

Mr. Lustig—All of you who run Benzidine Black, of course, have noted that there is a collection of white paste under the doctor in the steel and copper. That will break away. I don't know if it will scratch the roller. That hardens up after a while, and you must be very careful. That applies to individual colors, perhaps. But the scratching is to my mind largely mechanical.

If you use a strong caustic discharge base (like tannin discharges), you have seen cases where the copper was torn off almost in strips. But that was also largely caused, as I remember it, by mechanical impurities, simply by some hard part crystallizing out from the strong caustic.

Robert K. Lyon—I remember the first trouble that I ran across in the vat colors scratching was with Indanthrene Violet 2R, and that was all traced back to the factory. It was simply river water that carried a little silk that was not separated from the paste, and when the Badische people really found that it was grit, or sand, that they were importing from abroad, they took means to filter the water—and we paid for less sand and got more color. (Laughter.)

We found that while we were using the color that contained this grit, we got rid of the trouble almost entirely by vatting, simply making a vat of the color and letting it stand aside for possibly a week and then adding more hydrosulphite, and thickening. But it was entirely mechanical.

Mr. Lustig has brought up the point of caustic discharge on tannin grounds. I remember that a sure cure for that was the addition of a little bisulphite; our theory was that crystals were no longer formed as they were under the condition that we had before the addition of bisulphite.

I can't believe that it is very often chemical reaction or electrolytic, because we don't find copper on the doctor blade. I think that throws out the electrolytic theory, and we know that if we very carefully strain our water and are careful of our thickenings, and if in some cases we vat the colors before we prepare them for printing, we do not have the scratching.

George A. Moran—The electrolytic action is quite frequently bothersome, particularly on Aniline Blacks. You have a primary cell there, a muriate of aniline solution in a water solution of copper and a steel doctor blade against it, and quite frequently the copper will go into solution and precipitate on your steel doctor; it will gradually collect on the edge of the steel doctor and make a ragged edge and cause streaks and sometimes scratches, and necessitate rather short runs. At times this causes a good deal of bother, but sometimes it doesn't cause any bother at all. That is, you get electrolytic action sometimes without apparent reason, and at other times you may not have it for months or years, and then it will reappear again.

Of course, the most frequent cause of scratching is undoubtedly grit in some of the materials that you are using. Oftentimes it is in the starches. It may be in the gums or starches or in the dyestuffs, or other materials

that you are using, and the natural remedy is to get it out at the earliest stage possible.

President Olney—Are there any further remarks on this subject?

Dr. Robert Rose—There is one point that I haven't had time to look into, but in the last copy of Melliand's Textil Berichte, there is a description of some investigations on just this point, in which the investigator comes to the conclusion that even a starch can produce scratches if it is improperly prepared; that the nodules which form around the caustic, for instance, may be so hard that even then you will get scratches. It illustrates how very extensive the condition may be.

Mr. Lustig—I would like to add in connection with Dr. Rose's remarks that you very frequently get some sand in starch; we have had occasion to float our starch off before we would use it for these colors, positively float it, and we have found some of it (sand) on the bottom from where we floated the starch off.

P. J. Wood—Mr. Chairman, I don't think scratching is confined to printing of vat colors. I think you will find scratching in the printing of all colors, and it comes from every factor in the printing game.

There is one thing that hasn't been mentioned by anybody and that is the roller. These copper rollers are made in rolling mills and occasionally a little scale gets into them. I think most of us have had experiences where the printer at any rate would blame steel in the roller, and, in fact, on examining rollers with a microscope or magnifying glass, we have been able to detect little points of steel.

The roller is one of the factors. The goods have been mentioned by Mr. Lustig, and I think this can probably be overcome by beating or brushing the goods behind the printing machine. A great deal of it can be overcome in that way.

I don't think there is very much electrolytic action. I rather think in the case of a muriate of aniline solution, it is more the acid action on the doctor, because you do actually get a regular saw-tooth effect on the face of your doctor if you run very long.

There are some colors which are particularly apt to produce scratches. I can't think of many of them, but one of them that I remember particularly is Quinoline Yellow. I know we have often tried to run Quinoline Yellow in high concentrations, and particularly in discharge work, and also in direct printing, and we have had a sort of crystallization. It gums up on the face of the doctor and produces scratches.

We have had that in one particular pattern that I remember so often that we had to discontinue the use of Quinoline Yellow on that account. It didn't matter how much we strained it. We strained it through several thicknesses of silk just as finely woven as we could get the Japanese silk and we weren't able to remove or detect the grit. So I can't help thinking it was probably a recrystallization of the color.

Another frequent cause is grit which gets into the color after the color has been made up, coming from the air. Last year we had quite a good deal of trouble from this cause and finally we found there was a good deal of sand coming from the smokestacks. We had been using hard coal for many years and hadn't had much trouble, or we hadn't detected it; but last year we turned to the use of soft coal and found that in the back compartment of the flue space we had to take out every week several thousand pounds of fine sand, and a good deal of the finer parts of this made their way up the chimney and came down through the windows. We had a good deal of scratching from that cause, which we eliminated by screening the windows. You can't do it by screening them with copper, however. It has to be done with cheesecloth, because that seems to keep out grit better. It floats over with the soot. The heavier parts, of course, drop to the floor. It floats all over the mill.

Those are the main sources we have had. We have eliminated a great deal by using a better grade of tragacanth. In some grades of tragacanth we have found there is a remarkable percentage of sand, especially in the harder parts of the tragacanth. If we use a Number 1, which, of course, can't be used in cotton printing but can be used in silk printing, we find that we have very little scratching. In other words, we get little scratching in colors made up from the better grade of tragacanth.

Vice-President Killheffer—Is there anything more on the subject of scratching of rolls? (There was no further discussion of this subject.)

Increasing the Association's Service to Members

The President has so often spoken of and called your attention to the first item on the program that I think he would prefer that I bring that one up. It is: In what way can the Association be of greatest value to the members, to textile manufacturers, and to the dye producing and distributing agencies?

That is a mouthful, but surely there ought to be a good deal to say on that subject. You probably all have ideas as to what form some of the activities of the Association might take. Let's have them. We hear a good many expressions in private, among ourselves. Suppose we get up and talk about them right here. What have you got on your mind, Mr. Durfee? Do you still want to spend that money?

Winthrop C. Durfee—That is what I want. (Laughter.)

That doesn't seem to be a very live subject for an open forum, does it?

Arthur Thompson—Mr. Chairman, I have found a lot of square pegs in round holes, and it occurred to

me that if this Association had some sort of machinery whereby we could put the right kind of a peg in the right kind of hole, there would be a better feeling among certain of our members who are not in the right jobs at the present time.

The American Chemical Society has some medium through which those who want to change their jobs apply for positions through the Chemical Society, and they in turn refer them to firms that are looking for just that type of man. It occurred to me that if we had some sort of arrangement whereby our members could better themselves in that respect or whereby our manufacturers could find the men they needed for particular jobs, we would be serving our members and every firm and organization represented in the Society.

Vice-President Killheffer—That is a fine idea. We all want better jobs. (Laughter.) Has anybody else any ideas on the subject of an employment bureau?

Charles E. Mullin—This idea of Mr. Thompson's is very good. It has certainly worked out finely in England in the Institute of Chemistry. They have a plan over there whereby a member who is looking for a position, even though he is not out of work, subscribes to a fund—about three shillings, I think—for six months, and he is kept on a list. They circularize all the employers and the minute a position is open the applicants are notified; they send out a circular to all members who pay this small fee and thus put them in touch with this position.

They also have on file the qualifications of all the members. If an employer writes in for someone and they don't happen to have a man who is looking for a position with the qualifications specified by the employer, they go over their files and sort out the men that they can recommend for this position.

That has been one of the most successful features of the Institute in England. It is almost impossible for a first-class chemist to get a position in England to-day unless he is recommended by the Institute of Chemistry of Great Britain and Ireland. The American Chemical Society has worked out the same plan for this country, and if this Society could do that for dyers and chemists I think it would certainly be a wonderful thing.

President Olney—Are there any further remarks on this particular subject? If not, we will pass on to the next one, which sounds somewhat similar: In what way can the Association best co-operate with the textile educational agencies of the country?

Need for Junior Sections

In this connection, I would like to say that one way in which we can help is by encouraging the formation of Junior Sections. Only one Junior Section has been formed so far, and that is in connection with the Lowell Textile School, and I think there are a number of the members of that Junior Section present to-night. In that way I think we can develop a high grade of future members for the Association. I think it would be well if some of the other textile educational institutions, of which there are quite a number to-day, would take the matter up and encourage the formation of such junior sections. We have a special section in our by-laws which provides for them, and it is a comparatively simple matter to organize them.

At this time we might hear from some of the men who are graduates of textile schools. I know there are a great many here this evening. As I look around I see many that I have seen before, somewhere, in past years. Don't be afraid to get up and say something on this subject, if you have anything in your mind.

Mr. Steele—Mr. Chairman, I was the first president of our Junior Section at Lowell Textile, and one of the difficulties that I found was in getting speakers. There are a great many of you men who have been out longer than I have, who have had a great deal of experience, who could be of great assistance to the Junior Sections if you would offer your services when you are in the vicinity of Lowell or the other textile schools. The present President of the Junior Section at Lowell—Mr. Smith—is here, and if any of you could at any time give him an hour at the school, I am sure he will arrange his meetings so that you can talk on any subject. The boys at school, of course, don't know where they will land when they get out, and so they are looking for information on all subjects. (Applause.)

President Olney—I might say for the benefit of the Junior Section at the Lowell Textile School that there is one gentleman here to-night—Dr. Carter—who has offered to give a talk there and I think it would be a good plan if Mr. Smith talked with him before he leaves to-night. I would like to have Mr. Smith stand up so we can see who he is.

. . . Mr. Smith arose. . . .

Prof. Elmer C. Bertolet—Mr. Chairman, we have been working up the junior membership in Philadelphia, but we have been having these men come into the regular meetings of the Philadelphia Section; instead of multiplying the work and dividing the members, we thought it would be better to have the juniors in with the regular active members of the Section. It looks as though we will get seven or eight or perhaps ten junior members in Philadelphia this season, who will be members, or who will attend the regular active Philadelphia Section meetings.

We did try some time before this Society was inaugurated to have a little chemical club in the school, but as there wasn't sufficient interest among the boys at that time we discontinued it. It seems to be working out much better the way I have just described. I think we create better interest by having them come into the regu-

lar meetings than by having them go off as their own section by themselves. By that I do not mean that I object to anyone forming a junior section; but I think a local section of junior members is something that must be determined by conditions at the place in question.

President Olney—I can readily see how, in the case of Philadelphia, it might work out better the way Professor Bertolet has described, because there they have the regular section right in the same city with the school.

Are there any other remarks?

Old and New Methods in Printing

Vice-President Killheffer—There is a subject on the list that really should have been taken up with the first subject that we had under discussion. It leaves plenty of opportunity for interesting comment. That is: "Old and New Methods in the Printing of Textile Fabrics."

I don't know who suggested these topics, but it might be a good idea for the proposer in each case to start the thing going and to tell us a little bit about what he had in mind. It is a nice subject for me to propose, too, because it lets me out at the start; I don't know anything about it. I can just sit here and listen, and enjoy it.

"Old and New Methods in the Printing of Textile Fabrics"—that is almost made to order for you, Mr. Carter. (Laughter and applause.) Will you tell us something about the old methods, to start it?

Stewart F. Carter—I don't know, Doctor, whether I can. That is a very large subject.

Vice-President Killheffer—Start any place you please.

Mr. Carter—In what line? Just what line do you have in mind?

Vice-President Killheffer—Well, you can take your own choice. What is the oldest printing method you know about? (Laughter.)

Mr. Carter—That goes back a long, long time.

Perhaps one of the oldest methods of printing and one which has required the most technical knowledge is one that was known as the madder style of printing. In this, as you all know, we started off by printing on the goods the necessary mordants for the pattern. It was generally known as the madder style, because it was executed originally with madder, later with purpurine, and still later with alizarine.

In this style we were able to produce a number of different colors out of the same dye bath by means of the selection of mordants. For instance, for red, we would use aluminum, red liquor, acetate of aluminum, with a small addition of tin crystals. A weaker mordant could be used for pink.

The iron liquor, ferrous acetate, according to its dilution, will give us shades from black to various shades of purple. A mixture of iron and aluminum will give us different shades of chocolate. So in printing these different mordants, by suitably aging the goods, fixing them, and then dyeing, we could get a pattern where we could have, say, red, pink, some shades of purple, black and chocolate. After dyeing, the white portions of the goods were cleared by means of sodium and the application of chemic.

Another variation of that was what we called covered styles, where the objects might be printed on, together with an acid (lime juice), and then covered all over with another mordant, then dyeing the all-over pattern which resisted by means of the lime juice. We could produce a red object which had been covered over with iron mordant by means of the addition of the acid of aluminum paste and a very considerable amount of tin crystals. Those were called "resist reds." This object was printed, a cover of weak iron liquor suitably thickened was printed on, the goods were aged, fixed and dyed. Where the iron had passed over the aluminum, it was thrown off by means of a large quantity of tin crystals.

In the fixing of these mordants in the early days, the goods were spread out on the grass and aged there; then they are washed and dyed. This was satisfactory, as far as the condition of the art went at the time.

One day an accident occurred. Some goods had been printed that had large objects of red, aluminum acetate. They were spread out on the field. There were cows about in the field and some cow dung accidentally fell on one of the pieces. This piece was washed and let go forward for dyeing, and it was found in this case that the red was much fuller; this was the origin of the fixing process which is at the present time spoken of as dunging, where the goods were passed through a solution containing kaolin and chalk, and afterwards there was some sort of acetate of soda added to it. No chemical analysis could find any substance present in that to which this effect could be attributed.

As regards the clearing of the whites, this was done by soaping and chemicking. The goods were run through a weak chemic and slid over the drying cans, or through weak chemic, and through a small steam box.

As time went on, in printing Alizarine Red and White, or Alizarine Red, Black and White (that would be the aluminum mordant, together with Aniline Black, which is especially well known in handkerchief work), the chemicking and soaping was continued. I may tell you that in the case of the reds, after dyeing, the goods were oiled, using Turkey Red oil, and steamed, in order to develop the red.

It was found then by one man that the addition of oxalate of ammonium had a very welcome effect upon this. The goods, after dyeing and washing, were

padded through diluted Turkey Red oil, to which some oxalate of ammonium had been added. On steaming, the white became perfect; there was no need for chemicking. Investigations were made on this and it was found that this result was far better where the Turkey Red oil used had been neutralized altogether with ammonia. It was continued afterwards, and other substances were found to have the same result. The original oxalate of ammonium was discontinued. It was found that the addition of some phosphate of soda or silicate of soda had as good or even a better result. On steaming, the whites came out this yellowish cast, and on soaping they became absolutely perfect; there was no need for chemicking.

Another style which came up later—and which, in fact, originated in the United States—was the combination of basic colors along with an alizarine mordant, fixing and dyeing, oiling and so on; and the basic color stood the process of going through the dye bath. This was brought about by the addition of citric acid to the basic coloring. The basic color consisted of the ordinary basic dyestuff, along with tannic acid and some citric acid. This was a style which was rather a "mean" one to do. It was one of those styles where you got good samples and bad pieces. (Laughter.) The color generally printed was a green, as contrasting with and throwing up the red.

I was called upon at one time to do some of this style, if it was possible. I made some trials before starting. I took the goods after they were steamed and ready for fixing, and fixed them off in different ways. The first went through the ordinary way—through the open fixing, then through the spiral fixing, in hot water, and then on for dyeing. Some patches were done in that way. Some other patches were taken through the open fixing, and then instead of being given the second, or what we called the spiral, fixing, I gave the goods a very good cold-watering through a number of machines.

There were some other trials made which we need not enter into, as they didn't come out well. In the ones which had the ordinary fixing, the greens came out a miserable, dirty-looking sage. Some of the others were almost as bad, but in one swatch the green was perfect. On looking over the trials, I found that the one which had come out well was the one which had been through the open fixing only, where the hot spiral fixing had been dispensed with; it had been given a good cold-watering. On investigation, I found that in the hot fixing which followed, some of the aluminum which had come off attached itself to the tannin of the basic color, so that in dyeing up there was a small amount of alizarine dyed up on the basic color, and it produced this effect.

I thought that was good enough to see how it would go in practice; so I printed fifteen or twenty pieces in that way and went ahead with the dyeing, the red, the pink, the green, and they came out perfectly. After that, we ran the style for a very long time without any trouble whatever.

This trouble explained what people had been up against in making small trials. The practical conditions of the fixing did not obtain in the small trials which had been done by hand, and this aluminum which came off and fixed itself to the tannin had been the cause of all this trouble, which had been very much of a nightmare to all people who had tried this process. Many people had started by trying some pieces, and had been very much disappointed in the results.

Another variation of the madder style came out when the first artificial indigo was introduced. This was a light blue, which was gotten by means of what we called propionic acid, xanthate of soda and borax. The ordinary mordants were printed on and a light color of this blue was printed over; the goods were dyed, and the mordants threw it off, so that we got a blue color, in connection with these other mordants.

There are, of course, a great number of other styles which were done in the early days, but far too many really to cover in talking for just a few moments at this time. But still, as we look back, we find the art of printing has advanced day by day and month by month and year by year, each time bringing out something fresh, and bringing increased enthusiasm on the part of the people who practice the art. So it goes on, and so it will continue to go on for many a long day.

"Time cannot wither her, nor custom stale
Her infinite variety." (Applause.)

Vice-President Killheffer—Now that we have heard about the old methods in printing, let us hear some of the new methods. I suppose it is foolish to ask for the very newest thing, because whoever knows won't tell. (Laughter.) Is there any further discussion, however, on that subject, or any comments that anyone would like to make?

Mr. Carter—I would like to make one more remark: that style in which the basic colors were associated with the alizarine mordants in dyeing originated in Fall River, and was known in the trade at the time as the Harley style, because it originated with Mr. Harley, whom many here will remember.

Vice-President Killheffer—It seems I made a rather ambiguous remark a little while ago and some in the audience would like to know what it was all about. I addressed a little remark on the side to Mr. Durfee about spending some money, and there seems to be some confusion as to whose money it is that he wants

to spend. (Laughter.) Perhaps you would like to tell the assembled gathering, Mr. Durfee, all about this money.

THE RESEARCH FUND

Winthrop C. Durfee—Well, it is a research fund that belongs to the Association, and also an accumulation of dues, amounting to $4,000.

I happen to be treasurer of one or two organizations besides this one, and I am very much opposed to leaving any money in a place where it can tempt the treasurer to embezzle it. I have a reasonably strong conscience, but I haven't a great deal of fortitude in other directions.

The members can aid the Council and the Research Committee along this line by making suggestions. The Laundryowners' Association of the United States has done wonderful work of a research nature in various problems connected with the work of the modern, scientific laundry, so that the laundry of to-day is an industry built upon a highly scientific basis.

The Research Committee of this Association has done an enormous amount of volunteer work of the very highest order in the laboratories of the great printing establishments and some of the larger textile mills. It has not cost us anything as yet, but this matter has such magnitude that it is rather beyond the capacity or the abilities of the highly professional chemists who are in charge of these great laboratories, and it is really so important that it requires more than the amount of time that they can individually afford to give.

The second point is that there have been contributions to our Research Fund which haven't been used, and I believe the time has come when it is the duty of this Association to spend all the money it can possibly get (and spend it now) in studies that may be of great benefit to the textile industry, in research work that will help to put the whole textile world in a position where it will be far ahead of anything that has been done in this country or any other country.

I can say to-day that the work done by the Research Committee of this Association is far better than anything that has been done in any country in the world. The Germans made great research into the fastness of dyes, and published it all; but that is behind what we have done in this Association.

I do believe that we ought to spend the money at our disposal on researches that will be of great value to the industry as a whole, on problems that need explaining and development, in order that the textile manufacturers and the textile world in general that you represent may appreciate that we are doing an active work for the benefit of the industry in the United States. Therefore, I would like to see the funds in the treasury disappear as fast as possible, because I think that the result of that work, secondarily, will be that the industries will be more willing to indorse our work, and the ultimate result will be that we will have larger and larger funds for carrying on research work of inestimable value. I don't want the money in the treasury. (Applause.)

President Olney—I would like to say in that connection, the only trouble with Mr. Durfee's fund is that it isn't large enough. I am afraid you will get the impression that we have more money than we know what to do with, but as Chairman of the Research Committee I would say that we have a program mapped out that will cost a minimum of $10,000 a year, and we are hoping that Mr. Durfee will produce that $10,000 some day so that we can go right ahead with it. But I don't think Mr. Durfee need worry about our getting rid of that money. We voted some to-day for what I think will be a very valuable use, and that is to continue the work of our Sub-Committee on Fastness to Light. I don't want Mr. Durfee's remarks to put a check on your contributions to the Research Fund.

Mr. Durfee—I am merely asking you all to suggest problems that the Research Committee may not have in mind. I will repeat something I told Professor Olney this afternoon: he can't get any potatoes until he plants his seed. I think we have in that fund now $4,000, and we ought to start with that sum. If we will spend that $4,000 in a way that will show something, I think we will get $10,000, $20,000 and perhaps $30,000 from the industries very quickly. (Applause.)

Vice-President Killheffer—Are there any further comments on this subject under discussion, the research fund?

Alfred L. Lustig—I would like to ask Mr. Durfee if the Research Committee is doing all its work in the laboratories, or will they extend their work to the industrial plants? Can they make any investigations in industrial plants, and put up a problem that will interest perhaps most of us—in print goods, for instance. Could they delegate someone who is particularly skilled in investigating that problem to go around to the various plants and make a report to the Association?

Vice-President Killheffer—Of course, the work has rather followed that plan so far; that is, the work of the sub-committees, which has been devoted entirely, I think, to subjects of fastness to washing and light.

Mr. Lustig—Has that been done in industrial plants or in laboratories?

Vice-President Killheffer—In both. You see, the work has been distributed among different workers, and

then the results brought together for analysis and comparison.

Mr. Lustig—Then I would like to put this question to Mr. Durfee: If he wants to spend that $4,000, could he find a suitable man who could investigate the proper conditions for developing vat colors? What are the ideal conditions, and how close we can approach to ideal conditions? That means a good deal to the dyestuff manufacturers, to the textile manufacturers, and to the men in the laboratories and mills.

Mr. Durfee—You are started on the right line. Give us a lot more like that. That is just what I want.

Vice-President Killheffer—That is just the thing we want to bring out under some of these headings.

Mr. Lustig—I would like to point this out: that in Great Britain there is an organization doing research work that is supported largely by manufacturers, and that organization is doing excellent work. A good deal of it has not been published; it has simply been given to those who subscribe to their research fund. Perhaps you are familiar with it. Perhaps that plan can be used in connection with this.

President Olney—With regard to what Mr. Lustig has said, this $10,000 program that I speak of, if carried out, I think, would involve engaging several permanent men who could travel around on just such problems as that, perhaps spend six months in a certain plant or certain types of plant to investigate one particular subject—and that subject might readily be the one that you speak of.

Mr. Lustig—Pardon me, Mr. President, but I don't believe you could get several men for $10,000 who are competent to investigate the subject.

President Olney—Then we will have to raise that program to about $30,000. (Laughter.)

Mr. Durfee—My earnest suggestion is to do something and not let the money lie idle.

President Olney—There is one more subject that I think we should give those present an opportunity to discuss, because I have heard several say that they were interested in it; that is, the relative merits of open and closed systems for coloring of loose wool. Does anyone have anything to say on that? It is a subject that we often hear discussed on the side. Won't someone come out and discuss it here in the open at this time? We must have some wool dyers here somewhere. Perhaps Mr. Livermore may have something to say from his experience on that subject.

Wm. D. Livermore—I haven't anything at all to say, except that I would like to hear opinions of dyers who are accustomed to using the open tub and who still prefer it, as to the grounds for their preference. I think that is as far as I can go in the matter. The argument at present is all in favor of the machine form; that is to say, we are given a large variety of reasons why it is better, and I myself believe that it is better in a very general way; but I would be interested to hear from anyone else who feels that the open tub still has an important place, and I would like to know why he feels that way.

President Olney—Is there anyone here who can reply to Mr. Livermore's question? If not, I think we will have to vote that there is no question there at all; that it ceased to be a question some time ago.

There is one more question here: Modern application of liquid chlorine in bleaching. Does anyone wish to discuss that? We all know that liquid chlorine is used to-day in many of the larger plants. The question might be asked: Why is it that it is not used in all plants? Is it because it really costs more in the smaller plants, or because some believe they still get better results by using the old-time bleaching powder?

Dr. Killheffer suggests that perhaps someone would like to talk about something that isn't on the program. The meeting is wide open. Are there any special subjects you would like to suggest for discussion?

There is another subject on the program that hasn't been mentioned, and that is: Lime boil versus caustic boil. (There was no discussion of this subject.)

Bleaching Assistants in the Kier Boil

There is still one more subject: The advantages of bleaching assistants used in kier boil. Does anyone have anything to say on that subject. We all know that as time goes on there is a tendency to tinker with the combinations in the kier, sometimes with good results and sometimes with poor results. Some of the men who have bleacheries may have something to say on this subject.

Stewart F. Carter—The addition of bleaching assistants in the kier boil came up essentially as the caustic bleach came more into favor. That is a matter which brings up the question of lime boil and caustic boil.

The great use of the lime boil in bleaching was principally due to the fact that in the execution of the madder style, of which I have spoken, it was necessary to have a very perfect bleach in order to recover the white portions of the goods which had been slightly stained in dyeing. If the goods were not properly bleached, the stains which the alizarine gave on the cloth were very obstinate and it took a great deal of work to eliminate them.

The prime object of the lime boil was considered to be its action in promoting the removal of the cotton wax. The amount of cotton wax in cotton is considered to be on an average of four-tenths of 1 per cent, so if we get down to practical matters that would mean

that in a three-ton kier there would be 24 pounds of cotton wax to be dealt with. It was thought that the lime boil formed a combination with this wax which became broken up in the process of the subsequent gray sour, which put it in a condition in which it could be readily removed in the following boils with soda ash and resin soap.

When the caustic bleach came forward first, it was found that the removal of the wax was not as perfect as in the old lime bleach. The caustic bleach was preferred because it was shorter, and there was less trouble from stains. Anybody who has been connected with bleaching will readily agree that at least 75 per cent of the stains in the lime bleach originate in the lime kier.

This brought up the question of adding some body or bodies to the caustic boil which would eliminate the cotton wax. There was a great deal of experimenting done along this line in Europe, especially in the neighborhood of Alsace. The earlier ones experimented with the addition of soaps to the caustic. Afterwards it resolved itself into the addition of sulphonated oils combined with various hydrocarbon solvents.

The action in this case so far as I have been able to determine from experiments which I have made (I have made a good number of trials in practical work from time to time) has been this: that in the course of the caustic boil, the hydrocarbon solvent promoted a solution of the cotton wax, which then passed into combination with the oil, and then went into permanent emulsion with the caustic, and so was readily removed.

There has been a good deal of discussion as to whether the caustic boil under the best conditions will give the same results in the madder style, which is still practised in Europe, as the lime process and the question hasn't been altogether settled. Some people have claimed that they have gotten as good results, and others have held that they will have to hold to the lime. Of course, for general purposes the caustic bleach is the one which is most generally practised now. This, however, as regards the actual clearing of the cloth, remains somewhat of an open question. But so far as I have noticed from practical work done in that line, the addition of a proper kier assistant is of value and of very great value in the caustic process.

President Olney—Are there any further remarks on this particular subject?

R. L. Chase—I think Mr. Carter and I both had some experience in that line.

When I first started in the thread works business, we used the lime boil entirely; we didn't think we could do the caustic boil. At that time, they were doing the madder style, which Mr. Carter has spoken of. Afterwards, we were having so much difficulty with stains and with washing out the souring that we changed to the caustic boil. After trying that out a while, we tried some experiments on shirtings, thinking we did not get quite as good white with caustic as with lime. But further experiments showed that we did get practically as good results. No one could tell the difference in the pieces that we did either way. We did them each way, marked them, put them on the table, and no one could tell which was which.

After we had gotten on to the caustic boil, we then went back on some of the madder styles which while quite old in some ways had been done not so very many years ago, and we got good results with this caustic boil.

As to the use of assistants in the caustic boil, I can only say this: there has been much said about the advantage in using them. Before the war, where I was located, we used a hydrocarbon that was rather inexpensive. The war came on and the hydrocarbon became more and more expensive, until it finally got to about four or five dollars a gallon. We gradually stopped using it and finally forgot to use it and didn't notice any difference. Of course, if the price had kept to what it was originally, which was twenty-five cents a gallon, we might have kept on using it forever, but we finally dropped it entirely and used nothing but the caustic boil, and got just as good results by using that alone.

Alfred L. Lustig—Mr. Chairman, referring to Mr. Chase's comments regarding caustic boil and bleaching assistants, we have had quite the opposite experience as to the use of certain hydrocarbons in a type of work that we are doing, where we are perhaps working under unusual conditions, and where we do not wish to boil the goods too hard. We find that the addition of some hydrocarbons is very beneficial. Without it, the goods will not dye uniformly afterwards, and with it, we get very even results. There must be some reason, some action there.

Mr Chase—Poor bleaching. (Laughter.)

Mr. Lustig—There is no bleaching done.

John J. Sobolinski—In regard to kier assistants, some years ago we did considerable experimenting at Roessler & Hasslacher's on peroxide bleaching. We used to boil at first with caustic and then finally bleach. We found that with bleaching assistants added to the kier, the decomposition of the bleach bath was not nearly as rapid; that is, we got a much better white where we had bleaching assistants, for the simple reason that there was more wax removed with the bleaching assistant, thereby allowing the bleach bath not to act on the coloring matter, but to act on the material itself, and not on the dirt in the material.

Then we switched over to what is called the combination bleach, which, I believe, quite a few others use now, particularly on toweling, Turkish toweling, and material

that is rather spongy, that doesn't have a tendency to pack. I might say that there the addition of bleaching assistants will considerably retard the action of the peroxide bleach, thereby resulting in a more uniform bleaching.

We did leave it at that time slightly on the alkaline side. That is, we wouldn't add enough acid to completely neutralize it and allowed it to be slightly alkaline from the peroxide, then added either a soluble oil or a soap and bleached for several hours. The addition of the soap or solvent oil (whatever the bleaching assistant might be) would considerably retard the bleaching action and thus give a far more uniform bleaching effect.

President Olney—The time scheduled for our Open Forum is drawing to a close. I rather think it has been a success. We have certainly brought out a great many points here in one way or another on quite an extensive number of subjects. I wonder whether those present would recommend it for another time or not. Just out of curiosity, I am going to ask those who think that an Open Forum of this type is a valuable part of the program to raise their hands. . . . I should say a large majority are in favor of continuing it next year.

. . . The meeting then adjourned at 9.05 P. M. . . .

DECEMBER MEETING OF THE RHODE ISLAND SECTION

A joint meeting of the Rhode Island Sections of the American Chemical Society and the American Association of Textile Chemists & Colorists was held on Tuesday evening, December 1, in the rooms of the Providence Engineering Society.

Mr. Hostetter presided in the absence of Mr. Williams. The meeting was called to order at 8.30 P. M.

The speaker of the evening, Dr. Herty, was introduced and gave a most interesting discussion on "A Decade in the Development of the Key Industry," in which he told of the remarkable progress made in the development of America's dyestuff and chemical industry in the last ten years.

After the conclusion of his address, the audience was so keenly interested in Dr. Herty's remarks that they persuaded him to talk to them about the development of the chemical warfare service.

The meeting was adjourned at 11 P. M. and a rising vote of thanks was given the speaker of the evening. About fifty members and guests were present.

A dinner preceded the meeting at the Brown Faculty Club.

Dr. Herty received his Ph.D. from Johns Hopkins and subsequently studied in Berlin and Zurich. He was for many years a teacher of chemistry and also carried on administrative work. Later he became editor of the Journal of Industrial and Engineering Chemistry and held this office for a number of years, leaving it to assume the presidency of the Synthetic Organic Chemical Manufacturers' Association. He was president of the American Chemical Society in 1915-16 and has been connected with a large number of other scientific societies.

Respectfully submitted,

A. N. DANA, Secretary.

Applicants for Membership

Active Membership

Anderson, Arthur J., salesman, National Aniline & Chemical Company, New York City, N. Y. Sponsors: J. H. Culver and J. J. Sokolinski.

Lincoln, Warren E., demonstrator, Chemical Company of America, Boston, Mass. Sponsors: F. X. Lehman and D. P. Knowland.

Searle, David H., dyestuff salesman, General Dyestuff Corporation, Boston, Mass. Sponsors: Joseph W. Russell and George O. Linberg.

Spatz, Harry, demonstrator, Geigy Company, New York City, N. Y. Sponsors: D. P. Knowland and A. E. Elsmann.

Walsh, J. William, dyer, Textile Silk Dye Works, Philadelphia, Pa. Sponsors: H. E. Tillson and H. W. Martin.

Junior Membership

Borden, 4th, Jefferson, student, Bradford Durfee, Textile School, Fall River, Mass. Sponsors: F. E. Arnzen and A. E. Hirst.

Dole, Robert H., dyer, Dodge Davis Company, Bristol, N. H. Sponsors: L. A. Olney and J. M. Washburn.

Killheffer, John V., student, Lowell Textile School, Lowell, Mass. Sponsors: L. A. Olney and E. H. Killheffer.

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AMERICAN
DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

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THE UNDERTONE OF THE ANNUAL MEETING

"WHAT are the purposes of this society?" a man asked his neighbor at the table, during the Annual Banquet of the American Association of Textile Chemists and Colorists. The answer to that question echoed the word that had run like an undertone through all the proceedings of the Fifth Annual Meeting. For, after all, the significant feature of this annual meeting, and of all past meetings, was the earnest attempt to draw closer to the principal object of the Association—"to encourage in any practicable ways research work on chemical processes and materials of importance to the textile industry."

This note seemed to push itself into all the activities of the Annual Meeting. It seemed never to allow this group of its disciples to forget its presence. It was there as an undertone to their interest in more concrete matters. It sounded on the heels of the party that visited the laboratories of A. D. Little, for the actual evidence of research was there; it was in the front row at the Open Forum, speaking through the voice of the Treasurer when he declared it is now time to start spending the Association's research fund; it was symbolized distinctly in the first papers presented at the technical session, when the Research Committee explained the fine work it has accomplished and conveyed some idea of the work still to be done; it even rose to address the gathering at the banquet, rose again and again until, as one speaker said, it became a very tiresome word.

And because it has become so tiresome, "so popular that it is unpopular," because it recurs time and again in gatherings of scientific and technical men, in scientific journals and technical papers, it would seem hardly in good taste to speak or write more upon it. Yet we should certainly take note of the fact that at its Fifth Annual Meeting the American Association of Textile Chemists and Colorists advanced further toward this, its object. However impalpable its progress in this direction, still it *was* progress of a constructive kind; and it surely must have awakened many who until then had maintained an indifferent attitude toward the purposes of the Association.

If the Annual Meeting did this; if, furthermore, its undertone sounds louder in the future—loud enough, perhaps, to bring a response in the form of more research problems for the Association to solve and more funds with which to solve them—then the Fifth Annual Meeting was unquestionably one of the most important events in the development of textile chemistry.

RAYON SELECTION FROM THE DYER'S VIEWPOINT

WHEN a mill buys rayon is the dyer or chemist consulted as to the particular type of rayon best suited for the products of that mill?

This publication recently made a survey to determine the answer. The replies came directly from dyers, mill chemists and mill superintendents. Their opinions were enlightening. Most of those who did not actually say, "Yes, the dyer is consulted in the purchase of rayon" implied emphatically that he ought to be.

This opinion from the superintendent of a large New England print works, for example, fairly sums up the consensus of those who replied in the affirmative:

> I believe that the chemist and dyer should have almost complete control of the selection of the types of rayon to be purchased. In our own plants we have not gone into the purchase of rayon for weaving to any great extent, but I think that indescriminate buying by an official not thoroughly conversant with the peculiarities of each type of material will eventually be followed by a great deal of trouble and perhaps loss.

Of a similar nature is this statement from the superintendent of a nationally-known Southern firm of manufacturers, dyers and finishers:

> It is my experience that the chemists and dyers have a great deal to say as regards the rayon. In our own plant every sample of rayon is tested in the laboratory to determine to what particular group it belongs, and also to determine its dyeing qualities.

In many cases our inquiry seemed to stir a smouldering resentment in the dyer's breast and he came back frankly with a mild but undoubtedly justified tirade against the "illogicality" of those who should be most concerned in purchasing the proper rayon for their purpose. This from a hosiery dyer gives only a hint of all he had to say about the adverse conditions that make his life so merry:

> They (the purchasing department) keep on experimenting with different kinds and grades of art silk but I am kept absolutely in the dark and all I am expected to do is to give a better match and a

feeling superior to anyone else's. How is that for logic?

In considering this question of the dyer's opinion in the purchase of the most suitable rayon we should always remember that rayon is a chemical fiber and therefore, as one dyer so aptly expressed it, "should certainly demand as much chemical examination as the other chemical products bought in the plant." An identical view is held by the chief dyer of a large Rhode Island worsted mill, a man of considerable experience with both dyes and rayon:

> I am quite sure that in any mill where a chemist is employed he would be the person who would make the tests on the various types of rayon, and that the type that the mill might finally select would depend largely upon the findings of the laboratory, as it would seem to me that in the purchase of rayon the purchasing department must be guided by technical advice almost as largely as in the purchase of dyestuffs and soap.

Taking a broader view of the question, aside from the mechanical troubles almost certain to arise when the dyer is kept "absolutely in the dark," some stressed the purchase of rayon as a vital factor in the development of new fabric effects and consequently as of paramount importance. The chief chemist of a nationally known silk company, deploring the lack of co-operation between the purchasing and dyeing departments, writes:

> It would be a good thing if a campaign could be started in order to convince the manufacturers that they would be able to obtain still better effects in goods containing rayon, if they did look into the question of dyeing, before they purchased the rayon yarn.

The same idea is evident in this paragraph from another letter:

> I believe that many new uses for rayon and many effects still to be developed with the use of rayon must be initiated in the dyehouse or laboratory.

The results of this survey clearly show that while the dyer does not actually buy the rayon, in many cases his opinion is sought in solving the problem of selecting the proper rayon for the purpose; that when the dyer is not first consulted he works at a great disadvantage and frequently is unable to produce the desired effects in his dyeings. In short, co-operation with the dyeing department in this matter largely removes the element of guesswork, the uncertainty and expense of *experiment*, and consequently results in an appreciable economy of time and effort.

In the purchase of practically all material that can be chemically tested, in fact, the chemist should be considered as the person best equipped, with his knowledge and experience and his laboratory apparatus, to give information of definite value about the properties of that material. With the rayon market offering a score of varieties, all presenting their special problems and not one of them suited for all purposes, what should seem more logical than that the mill chemist's or dyer's opinion should carry considerable weight. Is he not the man who knows, better than anyone else, the local conditions and the dyeing and finishing methods in the plant? It ought to be apparent that in the purchase of a chemical raw material like rayon, which is to be processed with chemicals to attain certain definite results, only some one with a working knowledge of chemistry is capable of knowing whether those effects can be obtained on one type of material or another.

RECENT LITERATURE

Chemistry in Industry—A Co-operative Work Intended to Give Examples of the Contributions Made to Industry by Chemistry.—Volume II. The Chemical Foundation, Inc. 392 pages. 62 illustrations. $1.00.

We are told in the preface to this second volume of "Chemistry in Industry" that the first volume is now in its thirtieth thousand. The fact that a book of a semi-technical nature attains such circulation in the short time it has been off the press attests most encouragingly to the public demand for scientific information treated in a popular manner.

We stated in a review of Volume I that it was one of the most important non-technical expositions of industrial chemistry that have ever been published. As this second volume is identical in its scope, the same words apply to it. It carries on the work of its predecessor, reaching still further into widely divergent fields of industry, revealing, in chapter after chapter of stirring industrial romance, the part that chemistry plays in each. The authors of its twenty-two chapters, working under the editorship of Dr. H. E. Howe of Industrial and Engineering Chemistry, are authorities in their special fields of endeavor. They tell about their subjects in a concise, clear and entertaining style intended for the student, the business man and the general reader. The result is an instructive symposium of chemistry's place in more than a score of industries, from the construction of airships to the making of chocolate bonbons.

In a fascinating introductory chapter Ellwood Hendricks, curator of the Chandler Chemical Museum, Columbia University, reminds us that "if we have not a

sense of chemistry we are mentally blind," and then proceeds to explain for us one of the most timely subjects of discussion in the realm of chemistry—Catalysis. In a chapter entitled "The Chemical Rainbow," by M. L. Crossley of the Calco Chemical Company, we learn something of the molecular architecture of dyes and of the more "aristocratic" dye families. In another chapter the chief chemist of Colgate & Co. pictures the chemistry of soap manufacture. There is a story on the relation of chemistry to water supplies; and, of course, a most instructive chapter by M. G. Luft, of the Industrial Fibre Company, on the chemistry of rayon. Other chemists tell of chemistry's contribution to aviation, to electroplating, to refrigeration and to radio; of the function of chemistry in the manufacture of casein, confectionery, earthenware, explosives, glues and gelatins, inks, paints, varnishes and colors, cement, matches and lubricants.

Each chapter is copiously illustrated with interesting photographs of the plants, processes and products described.

Those who have read and enjoyed the first volume of this marvelous story of chemistry's achievements in industry are probably now reading the second; for they have found that their interest, once awakened by this fascinating subject, cries for more.

Again we must conclude with a word of well-deserved praise for the Chemical Foundation, which has undertaken to put before the American public this story of industrial chemistry in the most readable form possible—a story of such far-reaching significance to the future progress of the world that the effects wrought by a more universal understanding of it cannot properly be estimated at this period. Only time and circumstances will show the importance both of modern chemical research and of a general understanding of what that research contributes to civilization's advance. The one cannot function adequately without the other.

What Price Progress?—The Stake of the Investor in the Development of Chemistry. By Hugh Farrell. The Chemical Foundation, Inc. 102 pages.

"What Price Progress?" originally appeared in the New York Commercial in serial form. The matter has been rearranged and revised by the author, who is the financial editor of the New York Commercial, and is now offered as a booklet by the Chemical Foundation, in line with its laudable policy of disseminating the most worth-while contributions to the literature of chemical education for the benefit of the man on the street. These articles were primarily intended as a timely warning for industrial investors, in the sense that they point out how chemical developments and their salutary or disastrous effects upon various industries are closely related to the dividends and profits of those industries. The opening paragraphs give the keynote of the booklet:

> Are you the owner of stocks, bonds or other securities of any of the more than 200,000 corporations engaged in manufacturing, mining, transportation and various other pursuits in this country? If so, you had better begin to make inquiries with respect to what the companies in which you are interested are doing in the matter of keeping in step with progress in chemistry and chemical engineering.
>
> The chemist is revolutionizing industry. He is developing new products and new ideas every hour of every day. As a result of his work, flourishing industries are being scrapped overnight.

The chapters deal with chemical progress in a score of different industries: heat, power and light; iron, copper and aluminum; rubber, cement and fertilizer—these are a few of the products and services that have been revolutionized by chemical research. How chemistry has brought about significant changes in industry is told in this booklet in the language of the business man.

A Bibliography of Bibliographies on Chemistry and Chemical Technology, 1900-1924. By Clarence J. West and D. D. Berolzeimer. National Reserch Council, Washington, D. C., Bulletin No. 50. 308 pages, $2.50.

This work is composed of the following sections: General Bibliographies, Abstract Journals and Year-Books, General Indexes of Serials, Bibliographies of Special Subjects and Personal Bibliographies. As the title indicates, the work is a compilation of bibliographies published as separates, or at the end of books or magazine articles, or as footnotes to the same, on the numerous aspects of pure and applied chemistry. Each entry gives name of author or compiler, title, and place of publication. The majority of the entries state the number of references, thus giving an indication of the completeness of the particular bibliography. The entries are classified under the proper subject-headings, alphabetically arranged. The duplication of individual entries has been largely avoided by the liberal use of cross-references. An approximate analysis shows that there are about 2,400 subject-headings, 7,500 author entries and a total of 10,000 individual bibliographies. Although no claim is made for the completeness of the compilation, it is believed that the work will furnish a convenient starting point for any bibliographic search.

The Amoskeag Manufacturing Company now manufacturers of cotton goods, is making fabrics of artificial silk and also of cotton and artificial silk. The purpose of the plant is to produce their own artificial silk and for this purpose a new plant is being erected, some of the machinery having already been installed.

Dyestuff Tables

A List of the Principal American-Made Colors with Their Properties and Fastness Characteristics

[NOTE: The publishers of The REPORTER have secured more or less complete data in regard to many of the dyestuffs which are at the present time being manufactured in the United States. As the following material has been brought together from various sources, they realize that errors are quite likely to appear, and it is earnestly requested that any readers who find errors or who are able to give additional information will communicate with the publishers in order that this material may be made as correct, complete and up to date as possible. These tables will appear serially until all colors upon which we have data shall have been covered. The publication of this data was begun in the issue of March 10, 1924.]

CORRECTION

In the installment of the Dyestuff Tables published in the issue of November 30th, the name of the Amalgamated Dyestuff & Chemical Works (John Campbell & Co., selling agents) was omitted as an American manufacturer of Victoria Fast Violet 2R. This product has been made by this manufacturer for the past seven years under the designation of Ethonic Fast Violet 2RLN.

BENZO FAST ORANGE S

COMPOSITION: Azo dyestuff.

SPECIALLY SUITABLE FOR: Cotton.

USUAL METHOD OF DYEING: Glauber salt, common salt and soda.

SHADE: Very clear orange; redder overhand.

SHADE BY GASLIGHT: Somewhat redder.

SOLUBILITY: Four grams to liter cold; fourteen grams to liter hot.

LEVEL: Dyes level. In light shades in combination with other colors it fluoresces slightly.

EXHAUSTS: Well.

FASTNESS TO:

Acid: Very good; considerably better than S-340 or S-373.
Alkali: Good; 10 per cent soda or 20 per cent ammonia has no effect.
Chlorine: One and one-half degrees Baumé applied for five minutes does not affect the dyeing.
Fulling: Same as the other substantive oranges.
Ironing: Temporarily yellower.
Light: Considerably better than S-340 or S-373.
Perspiration: Fast.
Rubbing: Fast.
Washing: Poor; same as the other substantive oranges.

SENSITIVE TO METALS, LIME: The dyeings are rather sensitive to copper. Other metals and metallic salts affect the shade very little.

DYED BY OTHER METHODS: Suitable for printing, slubbing (acid) for wool discharge and for padding on cotton (also acid) with phosphate of soda and for printing silk (with phosphate of soda). Can be dyed in a standing bath with 5 per cent color in first bath and 3 per cent in second and 2 per cent in third.

ON OTHER MATERIALS: The color does not go on wool very well in a neutral bath. Dyed acid, shades fast to fulling are produced. On cotton-wool unions both fibers are dyed the same shade, the wool being somewhat lighter. On cotton-silk unions the silk is only slightly colored. On wool-silk in an acid bath the silk is dyed yellower than the wool. Useful shades fairly fast to water are produced on silk.

DISCHARGING: Gives a white discharge with tin and zinc. On account of its fastness to chlorine it is also used for a color discharge.

COMPETING PRODUCTS: Made in the United States by E. I. du Pont de Nemours & Co., under name of Pontamine Fast Orange B; Newport Chemical Works, Inc., under name of Direct Fast Orange RS.

INDANTHRENE BLUE RS

(Schultz No. 838)

SPECIALLY SUITABLE FOR: Cotton.

USUAL METHOD OF DYEING: Caustic and hydro at 120 to 130 deg.

SHADE: Reddish navy blue.

FASTNESS TO:

Acid: No change in shade with 1-10 sulphuric or 28 per cent acetic.
Chlorine: Changed to green; shade restored by hydro.
Light: Excellent.
Perspiration: Type for Class V (German classification).
Washing: Excellent.

COMPETING PRODUCTS: Made in the United States by Newport Chemical Works, Inc., under name of Anthrene Blue RS; E. I. du Pont de Nemours & Co., under names of Ponsol Blue RS and Ponsol Blue RP.

PONSOL BLUE 2GSL POWDER

(Schultz No. 841)

SPECIALLY SUITABLE FOR: Cotton.

USUAL METHOD OF DYEING: With hydro.

SHADE: Brighter and redder than S-881.

SHADE BY GASLIGHT: Greener.

SOLUBILITY: Similar to RS.

LEVEL: Dyes level.

EXHAUSTS: Well.

FASTNESS TO:

Acid: Fast to mineral and organic acids.
Alkali: Fast.
Boiling: Stands boiling
Chlorine: Goes greener.
Ironing: Fast.
Rubbing: Fast.
Washing: Fast.

ON OTHER MATERIALS: No interest.

COMPETING PRODUCTS: Made in the United States by E. I. du Pont de Nemours & Co., under name of Ponsol Blue 2GSL Powder.

INDANTHRENE BLUE GCD

(Schultz No. 842)

COMPOSITION: Dichlorinated Indanthrene Blue RS.

SPECIALLY SUITABLE FOR: Cotton.

USUAL METHOD OF DYEING: Caustic and hydrosulphate at 120 to 130 deg.

SHADE: Similar to S-843, but stronger.

SHADE BY GASLIGHT: Slightly redder.

SOLUBILITY: Good.

LEVEL: Dyes level.

FASTNESS TO:

Acid: Fast.
Alkali: Fast.
Carbonizing: Throws the shade a little greener.
Chlorine: Steaming the cotton after dyeing for two hours at 15 pounds makes color faster to chlorine.
Ironing: Fast.
Light: Excellent.
Rubbing: Fast.
Washing: Excellent.

DYED BY OTHER METHODS: Will dye cold, but weak.

COMPETING PRODUCTS: Made in the United States by Newport Chemical Works, Inc., under name of Anthrene Blue GCD; E. I. du Pont de Nemours & Co., under name of Ponsol Blue GD.

DIAZO SCARLET A AND R

(Colour Index No. 324a)

SPECIALLY SUITABLE FOR: Cotton.

USUAL METHOD OF DYEING: Soap and Glauber salt; diazotized and developed with Developer A.

SHADE: Inferior to the Diazo Brilliant Scarlets in brilliancy.

LEVEL: Dyes level.

EXHAUSTS: Inferior to the Diazo Brilliant Scarlets.

FASTNESS TO:

Acid: Very good to acetic.
Alkali: Fast.
Boiling: Equals the Diazo Brilliant Scarlets.
Chlorine: Same as the Diazo Brilliant Scarlets.
Cross-Dyeing: Inferior to the Diazo Brilliant Scarlets.
Ironing: Good.
Light: Excels Benzo Purpurine 4B.
Perspiration: Fast.
Rubbing: Fast.
Washing: Fast.

ON OTHER MATERIALS: Goes on silk better in a boiled-off soap bath with Glauber salt than the Diazo Brilliant Scarlets. The fastness to water on silk is very good.

DISCHARGING: Discharges white with Rongalite and zinc.

COMPETING PRODUCTS: Made in the United States by E. I. du Pont de Nemours & Co.

LITHOSOL BORDEAUX BN

(Pre-war prototype: Helio Bordeaux BL)

A good covering oil of a deep Bordeaux shade. The color is fast to oil and spirits, and in this respect is superior to Naphthylamine Bordeaux (S-106) and Autole Red RLP (S-166). It possesses the same light fastness as Lithol Red R (S-173), but cannot be compared with the shade of the latter. The color comes into consideration as a lithographic and water color. When precipitated with gypsum it produces a nice Bordeaux shade. The lake is obtained by boiling the color with barium chloride solution in the presence of the substrate. The use of calcium chloride instead has no advantage. The lake is perfectly fast to water.

COMPETING PRODUCTS: Made in the United States by E. I. du Pont de Nemours & Co.

PONTAMINE FAST PINK G

(Pre-war prototype: Benzo Rhoduline)

SPECIALLY SUITABLE FOR: Cotton.

USUAL METHOD OF DYEING: Salt and soda.

SHADE: Brilliant pink; similar to Brilliant Geranine (S-118).

SHADE BY GASLIGHT: Yellower.

SOLUBILITY: Fair.

LEVEL: Dyes level.

EXHAUSTS: Very well.

FASTNESS TO:

Acid: Fast.
Alkali: Fast.
Chlorine: Fair.
Fulling: Unusually good for a direct color.
Ironing: Good.
Light: Same as the Geranines.
Perspiration: Fast.
Rubbing: Fast.
Washing: Exceptional for a direct color.

This color is of interest on account of its unusually good fastness to washing, and as it exhausts clear it will be of special interest for yarn dyeing (ginghams, mercerized yarn and cops). For piece dyes where the drying takes place on cylinders, the color might not be acceptable on account of the change in shade. Light percentage dyeings are fast to washing against white. In dark shades the color exhausts very well and shades similar to magenta may be produced which are superior to magenta, as they do not crock.

ON UNIONS: Good on cotton-silk unions and cotton-wool unions, especially in a cold bath. In dyeing cotton-wool unions in a boiling bath the wool is somewhat yellower.

PRINTING: Suitable for silk printing. Fairly fast to water. Can also be printed on cotton-silk with phosphate of soda and soap. Suitable for padding cotton. Gives a good white with tin better than the Geranines. The discharge patterns can be soaped. Suitable for wool printing (pieces or slubbing) acid or with the addition of chrome alum. Suitable for direct printing on cotton and for application in mercerizing.

COMPETING PRODUCTS: Made in the United States by E. I. du Pont de Nemours & Co.

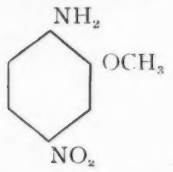
(*Continued on page 847*)

THE REDUCTION PRODUCTS OF AZO DYES

(*Continued from page* 822)

needles with green luster (toluene), mpt. 302°, blue-violet sol. in conc. H_2SO_4, light red pptte. on dil.

No. 63—4-AMINO-5-METHOXYNITROBENZENE (5-Nitro-2-Anisidine)



$C_7H_8N_2O_3$; Mol. Wt. 168.12; (C, 50.0%; H, 4.8%; N, 16.7%; O, 28.6%).

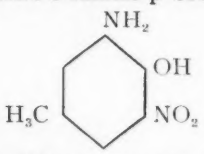
Derived from C. I. No. 117 by partial reduction.

Mpt. 139-40°. Insol. in cold 40% H_2SO_4 (distinction from 4-nitro-2-anisidine).

Acetyl deriv., yellow needles (alc.), mpt. 143°, readily sol. in alc. (mpt. given elsewhere as 153-4°).

Diazotized and coupled with: *β-naphthol*, small red cryst. with green reflex (toluene), mpt. 274-5°, wine-red sol. in H_2SO_4, red pptte. on dil.; *Naphthol AS*, red needles with green reflex (toluene), mpt. 293°, violet-blue sol. in H_2SO_4, bluish-red pptte. on dil.

No. 64.—o-NITRO-o-AMINO-p-METHYLPHENOL (5-Nitro-3-Amino-p-Cresol)

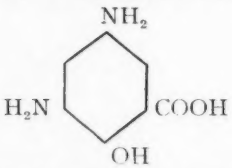


$C_7H_8N_2O_3$; Mol Wt. 168.12; (C, 50.0%; H, 4.8%; N, 16.7%; O, 28.6%).

Derived from C. I. No. 96 by partial reduction.

Red-brown shining leaflets (alc.), mpt. 110°.

No. 65.—3, 5-DIAMINO-2-HYDROXY BENZOIC ACID (Diamino Salicylic Acid)



$C_7H_8N_2O_3$; Mol. Wt. 168.12; (C, 50.0%; H, 4.8%; N, 16.7%; O, 28.6%).

Derived from C. I. No. 238.

Small colorless star-clustered needles which turn dark quickly in air. Sl. sol. in cold H_2O, readily in hot. Gives brown-red color with neutral $FeCl_3$ and eventually black flocks.

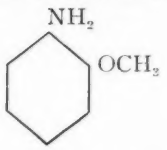
Hydrochloride, quadratic prisms, readily sol. in H_2O, difficultly in alc. Sols. are unstable to light. *Hydriodide*, yellow rhombic plates, stable in presence of excess HI.

For dyes by tetrazotization and coupling, see Friedlaender, III, 638, 639.

Dis-benzolazo-salicylic acid, red-brown needles, mpt. 218°, orange sol. in H_2SO_4, violet-red on dil. Gives acetyl deriv., mpt. 196°.

Dis-toluolazo-salicylic acid, glittering dark violet cryst., mpt. 170°. Gives acetyl deriv., mpt. 173°.

No. 66.—O-ANISIDINE



C_7H_9NO; Mol. Wt. 123.12; (C, 68.3%; H, 7.4%; N, 11.4%; O, 13.0%).

Derived from C. I. Nos. 112-115.

Oil. Mpt. 5°; bpt. 225° (cor.). D., 1.0914 at 25°. Very sol. in alc. and ether, very sl. sol. in H_2O.

Acetyl deriv., mpt. 84°, bpt. 303-5°.

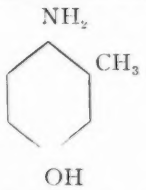
Salts with: *α-naphthalene sulf. acid*, mpt. 208°, 100 gm. aq. sol. at 10° contain .85 gm. salt; *β-naphthalene sulf. acid*, mpt. 207°, 100 gm. aq. sol. at 15° contain .26 gm. salt; *2, 7-naphthalene disulf. acid*, mpt. 229°, very sol.; 2, 6-naphthalene disulf. acid, mpt. >295°, 100 cc. aq. sol. at 15° contain 2.45 gm. salt.

Additive comp. with: *Sym. trinitrobenzene*, glistening, brownish-red plates (alc.), mpt. 98° (cor.); *1, 3-5-trinitronaphthalene*, black cryst. (acetone), mpt. 128°.

Condensation product with: *2, 4-dinitrobenzaldehyde*, yellow, mpt. 140°, insol. in H_2O but very sol. in org. solv.; *2, 4, 6-trinitrobenzaldehyde*, yellow cryst. (chloroform), mpt. 171.5; *tetryl* (giving 2', 4', 6'-trinitro-2-methoxydiphenylamine), red cryst. (alc.), mpt. 143°.

Diazotized and coupled with: *β-naphthol*, red cryst. powder with bronze reflex (Glacial Ac HO), mpt. 180° C., magenta-red sol. in H_2SO_4, red pptte. on dil.; *Naphthol AS*, red needles (toluene), mpt. 229°, violet sol. in H_2SO_4, bluish-red pptte. on dil.

No. 67.—o-AMINO-m-CRESOL



C_7H_9NO; Mol. Wt. 123.12; (C, 68.3%; H, 7.4%; N, 11.4%; O, 13.0%).

Derived from C. I. No. 103.

Small leaflets (C_6H_6). Mpt. 174-5°. Sublimes. Easily sol. in alc. and ether, slightly sol. in H_2O and C_6H_6.

Dibenzoyl deriv., long needles, mpt. 194°.

The hydrochloride is not colored by $FeCl_3$ (odor of toluquinone on warming).

Shaken with an alkaline sol. of α-naphthol (air) gives deep blue color (indophenol formation).

The Mathieson Alkali Works, Inc., has established a new district sales office at Fairmont, W. Va., with W. C. McAdoo in charge. The territory to be handled from the office includes nearly all of West Virginia, the southwestern section of Pennsylvania and a number of Ohio cities touching the Ohio River. Complete warehouse stocks will be maintained.

Foreign Dyes Imported Through New York and Other Ports During November

Compiled by the Chemical Division of the Bureau of Foreign and Domestic Commerce in Collaboration with the Chemical Division of the United States Tariff Commission

KEY TO ABBREVIATIONS OF MANUFACTURERS' NAMES

1—THE SIX LEADING GERMAN COMPANIES

A—Actien-Gesellschaft fur Anilin-Fabrikation, Berlin. Founded 1873.
B—Badische Anilin-und-Soda-Fabrik, Ludwigshafen-on-the-Rhine. Founded 1865.
By—Farbenfabriken, vormals Friedr. Bayer & Co., Leverkusen-on-the-Rhine. Founded 1862.
C—Leopold Cassella & Co., Frankfort-on-the-Main. Founded 1870.
K—Kalle & Co., A. G., Biebrich-on-the-Rhine. Founded 1870.
M—Farbwerke, vormals Meister Lucius & Bruning, Hochst-on-the Main. Founded 1862.

2—THE SMALLER GERMAN COMPANIES

BK—Leipziger Anilinfabrik Boyer & Kegel, Furstenberg, near Leipzig. Founded 1882.
CG—Chemikaliewerk Griesheim G. m. b. H., Griesheim-on-the-Main. Founded 1882.
CJ—Carl Jager G. m. b. H., Anilinfarbenfabrik, Dusseldorf. Founded 1823
GrE—Chemische Fabrik Griesheim-Electron, Offenbach-on-the-Main. Founded 1842.
L—Farbwerk Mulheim, vormals A. Leonhardt & Co., Mulheim-on-the-Main. Founded 1879
tM—Chemische Fabriken, vormals Weiler ter Meer, Uerdingen-on-the-Rhine. Founded 1877.
WD—Wulfing, Dahl & Co., A. G. Barmen. Founded 1842.

3—SWISS COMPANIES (ALL AT BASEL)

DH—Farbwerke vormals L. Durand, Huguenin & Co. Founded 1871.
G—Anilinfarben-und Extract-Fabriken, vormals Joh. Rud. Geigy. Founded 1764.
I—Gesellschaft fur chemische Industrie. Founded 1885.
S—Chemische Fabrik, vormals Sandoz & Co. Founded 1887

4—DUTCH AND FRENCH COMPANIES

FA—Farbwerk Ammersfoort, Ammersfoort, Netherlands. Founded 1888
NF—Niederlandische Farben-und-Chemikalienfabrik Delft, Delft, Netherlands. Founded 1897.
CN—Compagnie Nationale de Matieres Colorantes et Produits Chimiques. Founded 1917. (Etablissements Kuhlmann merged with this company in 1923.)
P—Societe Anonyme des Matieres Colorantes et Produits Chimiques St. Denis (formerly A. Poirrier). Founded 1830.

5—ENGLISH COMPANIES

Bro—Brotherton & Co., Ltd., City Chambers, Leeds.
BAC—British Alizarine Co., Ltd., Manchester
BD—British Dyestuffs Corporation, Ltd., London.
Cl Co.—The Clayton Aniline Co., Ltd., Clayton, Manchester.
CV—The Colne Vale Dye & Chemical Co., Ltd., Milnsbridge, Huddersfield.
Hol—L. B. Holliday & Co., Ltd., Huddersfield.
Scot—Scottish Dyes, Ltd., Grangemouth.

FOREIGN dyes imported through New York and other ports during the month of November totaled 414,755 pounds, valued at $295,885. The imports of dyes by ports were as follows: New York, 411,779 pounds, with an invoice value of $293,269; Boston, 1,976 pounds, with an invoice value of $1,616; Philadelphia, 1,000 pounds, with an invoice value of $1,000.

Imports of Synthetic Dyes

1925—	Pounds	Invoice Value
January	403,984	$359,376
February	373,259	365,268
March	527,964	488,501
April	451,005	426,141
May	370,271	347,904
June	376,668	333,654
July	675,843	692,615
August	330,674	303,612
September	298,858	285,642
October	537,312	471,466
November	414,755	295,885
Total, eleven months..	4,760,593	$4,370,064

1924—	Pounds	Invoice Value
January	283,643	$237,868
February	161,869	180,570
March	302,799	307,247
April	176,550	183,789
May	183,079	177,553
June	153,019	156,857
July	143,680	139,558
August	80,396	87,014
September	160,978	159,620
October	527,672	545,615
November	378,554	369,951
Total, eleven months..	2,507,239	$2,545,642

Five Leading Dyes, by Quantity, Imported During November

	Pounds
Rhodamine B Extra (single strnegth)	52,305
Rhodamine 6G Extra (single strength)	41,038
Ciba Violet B (single strength)	23,142
Brilliant Indigo 4B Paste	17,806
Ciba Scarlets (single strength)	16,107

Dyes and Intermediates Remaining in Bonded Customs Warehouse

	Coal-Tar Dyes and Colors (pounds)	Coal-Tar Intermediates (pounds)
January 31, 1925	571,371	952,202
February 28, 1925	566,038	961,406
March 31, 1925	653,020	1,050,539
April 30, 1925	668,365	1,048,324
May 31, 1925	734,705	1,087,745
June 30, 1925	825,528	1,171,383
July 31, 1925	775,916	1,378,837
August 31, 1925	767,431	1,363,760
September 30, 1925	709,381	1,359,717
October 31, 1925	609,750	1,055,241

Per Cent of Dyes by Country of Shipment

	Nov.	Oct.	Sept.	Aug.	July
Germany	47	72	62	51.5	57
Switzerland	47	10	21	36	32
Italy	1.5	3	3	4	2
England	1	5	3	3	3
France	0.5	3	2	3	1
Belgium	1.5	4	5	1	1
Canada	1.5	3	2	1	3
Holland	..	..	2	0.5	1

Imports of Color Lakes

	Pounds	Invoice Value
January	385	$728
February	2,112	1,926
March	5,422	2,061
April	15,660	6,167
May	1,600	1,079
June	3,014	1,511
July	611	474
August	6,317	2,677
September	8,760	4,543
October	23,310	5,813
November	198	....

The dyes in this report are grouped by both Colour Index and Schultz numbers, and in the case of those which could not be identified by either number the classification according to the ordinary method of application was adopted. As the pastes and powders of the vat dyes vary widely in strength and quantity, each vat dye has been reduced—in nearly every case—to a single-strength basis.

DYES OF COAL-TAR ORIGIN*

Colour Index No.	Schultz No.	Name of Dye and Mfr.	Quantity (pounds)
11	..	Amido Yellow E—(M)	20
16	137	Hansa Yellow 10G Lumps—(M)	50
124	129	Chromazone Red New Conc.—(G)	771
127	118	Geranine G—(By)	99
172	159	Acid Alizarine Black R—(S)	2,204
196	175	Acid Ponceau E—(G)	220
316	273	Diazamine Blue BR Conc.—(S)	5,004
319	..	Chlorazol Fast Helio BK—(BD)	300
368	306	Ignamine Orange 3G—(B)	750
371	308	Developing Black OT—(C)	50
382	319	Chloramine Red B—(S) Chloramine Red 3B—(S) Diamine Scarlet 3B—(C)	3,786
430	..	Polar Red R Conc.—(G) Polar Red RS Conc.—(G)	2,866
436	358	Chloramine Red 8BS—(By) Chlorantine Red 8BN—(I) Toluylene Red Powder—(AG)	1,466
440	360	Ignamine Orange R—(B)	500
459	373	Congo Orange—(AG)	500
487	400	Acid Milling Red R Conc.—(G) Brilliant Milling Red R—(C)	1,602
488	404	Diamine Yellow N Powder—(C)	100
561	449	Trisulphon Brown B Conc.—(S)	2,001
581	462	Cotton Black E Extra Conc.—(B)	100
636	19	Fast Light Yellow 3G—(By)	419
639	22	Supra Light Yellow 2GL—(By)	383
649	26	Triazogene Orange R Powder—(AG)	100
652	29	Eriochrome Red B—(G)	2,755
667	503	Benzyl Green B—(I) Brilliant Milling Green B—(C)	951
677	512	Magenta Powder AB—(B)	1,500
680	515	Methyl Violet Base—(B) Methyl Violet 4B—(AG)	225
681	516	Crystal Violet Extra Powder—(B) Crystal Violet Extra Crystals—(t-M)	620
692	524	Magenta S—(B)	200
698	530	Acid Violet 6B Extra—(t-M)	1,000
702	534	Acid Violet 7B Conc.—(B)	5
704	364	Alkali Blue 2B Conc.—(t-M) Alkali Blue 3R Conc.—(t-M)	480
705	537	Methyl Blue 3G—(t-M)	25
710	541	Betamine Blue 8BL Extra—(AG)	112
712	543	Patent Blue V—(M)	1,000
714	545	Kiton Blue A—(I) Patent Blue A—(M) Poseidon Blue BXX—(B) Poseidon Blue BR Extra—(B)	2,718
715	546	Cyanol Extra—(C)	127
717	548	Acid Violet 6BN—(I) Acid Violet 6BNG—(G)	2,424
729	559	Victoria Blue B Base—(B) Victoria Pure Blue BO—(B)	600
733	562	Intensive Blue B—(By)	100
735	564	Naphthalene Green Conc.—(M)	360
749	573	Rhodamine B Extra (s. s.)—(B) Rhodamine B Extra (s. s.)—(I) Rosazeine B Extra (s. s.)—(M)	52,305
752	571	Rhodamine 6G Extra (s. s.)—(I)	41,038
757	580	Fast Acid Violet B—(M)	200
774	593	Phloxine—(M)	25
788	603	Acridine Orange DHE—(DH) Brilliant Acridine Orange A—(DH)	1,543
789	..	Patent Phosphine GG—(I)	1,098
793	606	Phosphine O—(M) Phosphine 3R—(AG)	3,500
795	607	Runic AL Conc.—(B)	500

*This table includes imports through the port of New York to the amount of 411,779 pounds, and also 1,976 pounds through the port of Boston and 1,000 pounds through the port of Philadelphia.

Colour Index No.	Schultz No.	Name of Dye and Mfr.	Quantity (pounds)
797	608	Euchrysine RRRX—(B)	
		Patent Phosphine GRNTN—(B)	
		Patent Phosphine RRDX—(B)	3,062
801	613	Quinoline Yellow—(I)	551
828	672	Azo Carmine GX—(B)	800
829	673	Azo Carmine BX—(B)	224
833	..	Wool Fast Blue BL—(By)	889
865	700	Silver Gray P—(AG)	50
875	923	Fur Brown P—(AG)	
		Nako B, SB, DMG, 2G, 3GN—(M)	
		Nako Black DBB—(M)	
		Nako Gray B—(M)	450
878	622	Brilliant Delphine Blue B—(S)	1,000
879	..	Chromazurine E Powder—(DH)	220
884	627	Chromacetine Blue S Extra—(DH)	661
894	637	Gallamine Blue Extra Paste—(G)	5,168
924	660	Methylene Green W—(G)	4,850
926	661	Thionine Blue GO—(M)	500
927	663	New Methylene Blue N—(M)	700
1027	778	Alizarine VI Extra Pure—(B)	4,190
1033	779	Alizarine Orange R Paste—(M)	1,000
1034	780	Alizarine Red W Powder—(By)	
		Alizarine Red S—(Q)	715
1035	782	Anthracene Brown SW Powder—(B)	200
1053	..	Alizarine Blue WS—(By)	
		Alizarine Sapphire Blue SE—(I)	
		Alizarine Saphirol WSA Powder—(By)	1,862
1059	800	Anthracene Blue WB Paste—(B)	
		Anthracene Blue WG Paste—(B)	2,123
1067	804	Alizarine Blue S Powder—(B)	500
1073	852	Alizarine Blue JR—(By)	
		Alizarine Direct Violet ER—(By)	
		Alizarine Irisol R Powder—(B)	728
1078	865	Alizarine Cyanine Green G Ex. Pdr.—(By)	861
1084	854	Alizarine Viridine FF Paste—(By)	1,985
1088	855	Alizarine Blue SKY—(By)	
		Alizarine Sky Blue B Powder—(By)	823
1095	759	Anthra Yellow GC Paste Fine—(B)	
		Anthra Yellow GC Dbl. Pst. (s. s.)—(B)	
		Anthra Yellow GC Powder (s. s.)—(B)	
		Helindone Yellow AGC Powder (s. s.)—(M)	
		Vat Yellow GC Powder (s. s.)—(B)	6,390
1097	761	Vat Orange RRT Paste—(B)	3,250
1106	838	Vat Blue RSP Tr. Pdr. (s. s.)—(B)	1,200
1109	840	Vat Blue 3G Paste—(B)	
		Vat Blue 3G Powder (s. s.)—(B)	2,952
1113	842	Helindone Blue IGCD Dbl. Pst. (s. s.)—(M)	
		Indanthrene Blue GCD Paste—(B)	
		Vat Blue GCD Dbl. Pst. (s. s.)—(B)	8,440
1114	..	Helindone Blue IBCS Powder (s. s.)—(M)	2,500
1118	849	Vat Yellow G Dbl. Pst. (s. s.)—(B)	
		Vat Yellow G Dbl. Pst. Fine (s. s.)—(B)	5,762
1120	867	Anthra Brown B Paste—(B)	860
1123	848	Anthra Gray B Dbl. Pst. (s. s.)—(B)	900
1132	817	Vat Yellow GK Powder (s. s.)—(By)	2,400
1133	819	Algol Red R Extra Powder (s. s.)—(By)	
		Vat Red R Extra Powder (s. s.)—(By)	3,984
1135	820	Vat Brilliant Violet RK Paste—(By)	397
1136	822	Vat Orange RRK Powder (s. s.)—(By)	800
1137	824	Vat Orange 6RTK Paste—(By)	25
1143	827	Anthra Bordeaux R Paste—(B)	942
1145	834	Vat Gray GK Powder (s. s.)—(By)	80
1151	..	Vat Brown R Paste—(By)	
		Vat Brown R Powder (s. s.)—(By)	
		Vat Brown IR Paste—(M)	3,232
1161	871	Vat Red Violet RRK Paste Fine—(B)	1,344
1163	832	Vat Violet BN Powder (s. s.)—(B)	
		Vat Violet BN Extra Powder (s. s.)—(B)	628
1171	868	Cibanone Brown B Paste—(I)	
		Cibanone Brown B Powder (s. s.)—(I)	1,221
1174	..	Cibanone Green B Powder (s. s.)—(I)	1,100
1178	876	Indigo Vat, Grains—(B)	50
1184	881	Brilliant Indigo 4B Paste—(B)	17,806
1186	883	Indigo MLB/6B Powder (s. s.)—(M)	2,000
1190	885	Brilliant Indigo B Paste—(B)	2,444
1196	890	Ciba Yellow G Paste—(I)	110
1198	891	Ciba Green G Dbl. Pst. (s. s.)—(I)	2,426
1202	893	Alizarine Indigo G Paste—(By)	400
1207	912	Ciba Pink B Paste—(I)	551
1211	910	Thioindigo Rose BN Extra Paste—(K)	500
1212	918	Ciba Red 3B Paste—(I)	
		Ciba Red 3B Powder (s. s.)—(I)	
		Thioindigo Red 3B Paste—(K)	
		Thioindigo Red 3B Powder (s. s.)—(K)	
		Vat ed Violet RH Paste—(B)	9,571
1217	913	Helindone Orange R Paste—(M)	
		Helindone Orange R Powder (s. s.)—(M)	
		Hydron Orange RF Paste—(C)	3,500
1219	920	Thioindigo Violet 2R Powder (s. s.)—(K)	1,000
1220	899	Ciba Gray G Powder (s. s.)—(I)	1,100
1222	901	Ciba Violet B Paste—(I)	
		Ciba Violet B Powder (s. s.)—(I)	23,142
1228	907	Anthra Scarlet GG Paste—(B)	2,348
1228	907	Ciba Scarlet G Extra Paste—(I)	8,170
1220	907	Helindone Fast Scarlet C Paste—(M)	4,000
1226	907	Thioindigo Scarlet 2G Paste—(K)	1,589
1229	908	Ciba Red R Dbl. Pst. (s. s.)—(I)	10,362
1230	911	Ciba Orange G Paste—(I)	110

UNIDENTIFIED DYES

Acid Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Acid Blue RBF	220
Acid Rhodamine BG—(B)	500
Alizarine Direct Blue A—(M)	1,000
Alizarine Leveling Blue CA—(C)	100
Astra Phloxine FF Extra—(By)	100
Brilliant Wool Blue FFR Extra—(By)	551
Cashmere Black TN—(By)	100
Erio Carmine 2BC—(G)	551
Indocyanine B—(AG)	1,000
Kiton Fast Red R—(I)	110
Leveling Silk Blue B—(C)	50
Milling Orange G—(AG)	300
Milling Yellow GA—(AG)	200
Polar Gray—(G)	220
Polar Orange R Conc.—(G)	4,629
Poseidon Green VGGX—(B)	300
Radio Black SB—(C)	50
Radio Brown B—(C)	50
Radio Brown S—(C)	50
Radio Red G—(C)	40
Silk Blue BSIC Powder—(AG)	200
Soluble Blue 2BX Conc.—(TM)	60
Sulphon Orange G—(By)	275
Supramine Yellow R—(By)	99
Water Blue Powder—(AG)	100
Wool Black GRF—(AG)	2,000
Wool Violet RC—(G)	110
Xylene Milling Blue BL Conc.—(S)	1,022

Vat Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Anthra Brilliant Green 5G Paste—(B)	440
Anthra Orange RH Paste—(B)	500
Anthra Pink R Extra Paste—(B)	
Anthra Pink R Extra Powder (s. s.)—(B)	5,200
Anthra Scarlet B Powder (s. s.)—(B)	1,200
Anthra Wool Black R Vat Solid—(B)	200
Anthra Wool Red BB Vat Solid—(B)	100
Anthra Wool Yellow GG Vat Solid—(B)	200
Helindone Brown IRT Paste—(M)	1,000
Helindone Khaki IGG Paste—(M)	500
Helindone Pink R Extra Paste—(M)	2,500
Helindone Printing Black RD Paste—(M)	5,000
Hydron Brown G Paste—(C)	
Hydron Brown G Powder (s. s.)—(C)	740
Hydron Pink FB Paste—(C)	
Algol Brilliant Pink FB Paste—(By)	
Anthra Pink B Extra Paste—(B)	
Helindone Pink B Extra Paste—(M)	3,419
Hydron Scarlet BB Paste—(C)	1,000
Hydron Yellow GG Powder (s. s.)—(C)	500
Vat Blue 3GP Paste—(By)	1,280
Vat Blue Green B Dbl. Paste (s. s.)—(B)	992
Vat Brown 2G Paste—(B)	
Helindone Brown IGG Paste—(M)	2,440
Vat Green G Powder—(s. s.)—(B)	200
Vat Green 2G Dbl. Paste (s. s.)—(B)	440
Vat Pink B Dbl. Paste (s. s.)—(B)	4,110
Vat Yellow GP Powder—(B)	1,000

Mordant and Chrome Dyes

Acid Alizarine Gray G—(M)	1,000
Acid Anthracene Brown WSG—(By)	400
Acid Chrome Blue 5R—(By)	3
Brilliant Chrome Violet 3RN—(DH)	220
Chrome Green BF—(C)	50
Chrome Printing Orange 2R—(I)	110
Eriochrome Black E—(G)	551
Eriochrome Red G—(G)	651
Eriochrome Violet B—(G)	1,653
Metachrome Olive D—(AG)	100
Modern Olive JN Powder—(DH)	220
Radio Chrome Green B—(C)	50
Ultra Corinth B—(S)	200

Direct Dyes

Benzo Fast Orange 2RL—(By)	441
Benzoform Blue 2BL—(By)	10
Benzoform Bordeaux R—(By)	10
Benzoform Brown 4R—(By)	10
Benzoform Brown VL—(By)	10
Benzoform Green FFL—(By)	10
Benzoform Orange G—(By)	10
Benzoform Red 2GF—(By)	10
Benzoform Yellow GL—(By)	10
Benzoform Yellow R—(By)	10
Brilliant Congo Violet R—(AG)	700
Brilliant Pure Yellow 6G—(By)	110
Brilliant Sky Blue 2RM—(By)	445
Chloramine Fast Orange G Conc.—(S)	500
Chloramine Fast Orange R Conc.—(S)	500
Chloramine Light Gray R Conc.—(S)	385
Chlorantine Brown I—(I)	2,204
Chlorantine Fast Blue 8GL—(I)	2,314
Chlorantine Fast Brown 3GL—(I)	3,747
Chlorantine Fast Brown RL—(I)	2,646
Chlorantine Fast Violet RL—(I)	4,408
Chlorantine Fast Violet 2RL—(I)	1,102
Chlorantine Fast Violet 5BL—(I)	3,858
Developing Black ED—(C)	50
Developing Blue B—(AG)	1,100
Diamine Azo Brown G—(C)	522
Diamine Azo Fast Green G—(C)	512
Diamine Azo Yellow 2G—(C)	118
Diamine Catechine 3G—(C)	500
Diamine Fast Brown 3G—(C)	50
Diamine Fast Brown R—(C)	50
Diamine Fast Orange ER—(C)	750
Diamine Gray G—(C)	50
Diaminogene Blue GG—(C)	220
Dianil Fast Violet BL—(M)	300
Diazo Brilliant Green 3G—(By)	1,150
Diazo Brilliant Scarlet 2BL—(By)	67
Diphenyl Fast Bordeaux BC—(G)	220
Direct Blue G Powder—(G)	55
Direct Fast Heliotrope 2RL Powder—(By)	277
Direct Sky Blue 8GX—(By)	440
Fast Cotton Gray GL—(AG)	100
Fast Cotton Gray VL—(AG)	500
Fast Cotton Violet 4R—(AG)	100
Minaxo Black BBNX—(B)	300
New Claret RX—(B)	50
Rosanthrene Orange R—(I)	1,653
Rosanthrene Fast Red 7BL—(I)	220
Triazol Light Orange 2RL—(GrE)	441

Dyes for Artificial Silk

Blue Extra Paste—(B)	100
Duranol Blue G Paste—(BD)	272
Duranol Orange G Paste—(BD)	172
Duranol Red G—(BD)	112
Ionamine A—(BD)	60
Ionamine L—(BD)	60
Orange Extra Paste—(B)	100
Pink R Extra Paste—(B)	100
Red Violet Extra Paste—(B)	100
Setacyl Direct Blue R Powder—(G)	440
Setacyl Direct Yellow R Powder—(G)	220
Violet B Extra Paste—(B)	100
Yellow R Paste—(B)	100
Yellow 3G Paste—(B)	100

Sulphur Dyes

Eclipse Dark Brown BC—(G)	110
Eclipse Brown RRC—(G)	110
Immedial Direct Blue B—(C)	1,000
Immedial Indogene GCL Conc.—(C)	1,000
Pyrogene Pure Blue 3GL—(I)	992
Pyrogene Brown G—(I)	551
Sulphide Violet B—(M)	500
Thionol Direct Blue S—(BD)	1,000

Basic Dyes

Diazine Black G—(K)	165
Rhodamine 6GDN Extra (s. s.)—(B)	5,000

Color Lake Dyes

Antol Orange Powder—(B)	200
Ceres Blue III—(By)	5
Helio Bordeaux BL Paste—(By)	2,824
Onis B—(B)	200

Unclassified Dyes

Nooazol Violet B—(G)	220
Primal Black—(A)	500
Special Violet B—(B)	200

Technical Notes from Foreign Sources

Zinc Dust in Printing Woolen Fabrics

In the process of discharge printing with mixtures that contain zinc dust and bisulphite of soda, the active reagent that results is the hydrosulphite of soda. Of course, this reagent is due to the reducing action of the zinc on the sulphite soda, and the question arises whether or not the zinc dust itself has some other action on the printing process. This seems to be indicated by the fact that when zinc dust discharge pastes are employed in the printing process it is possible to secure a better white color than when a zinc salt is used in place of the metallic zinc powder, as, for example, the chloride of zinc. The net result is that the woolen goods printed with such a discharge paste are better suited for the production thereon of colored discharge designs.

When the zinc dust discharge paste has been used, the goods, after being steamed, must be treated with a dilute solution of hydrochloric acid, in order to remove the last traces of the zinc dust. In the original article in Textile Recorder, 1925, page 70 ff, there are given a number of formulae for discharging with zinc dust in resist printing, for which process this material is particularly well suited. In this case the zinc dust is employed in combination with kaolin and a suitable thickening agent. Bisulphites and hydrosulphites are also added to these printing pastes. The acid coloring matters are best suited of all the dyestuffs for printing by this process.

Viscose Silk Manufacture

The manufacture of viscose silk can be simplified to an important degree when certain operations, particularly the solution of the xanthogenate, is carried out at low temperatures which vary between 0 deg. Cent. and 25 deg. Cent. Under these conditions it is possible to work with caustic soda solutions which are of lesser concentration and also with less than the theoretical amount of carbon disulphide required for this purpose for the production of usable solutions of viscose.

To this end it is just necessary to carry out the mercerization, the sulphiding and the dissolving operations at a uniform temperature of 0 deg. Cent., and the entire series of operations may be carried out in one and the same vessel within a few hours' time. For example, the sulphite cellulose is treated with ten times its weight of a 6 to 10 per cent solution of caustic soda lye at a temperature of 0 deg. Cent., and then while the temperature is maintained at the same point there is added from 5 to 50 per cent of carbon disulphite. The reaction mass is then cooled down to a temperature of 11 or 12 deg. Cent. and then it is dissolved in the dilute caustic soda lye. (This process is patented in British Patent No. 212,865.)

Hydrophile Linen

The hydrophile cotton used in surgery possesses the unwished for property of heating up. The invention described in French Patent No. 453,500 seeks to use hydrophile linen in the place of cotton material.

In order to manufacture this material the fibers, after being separated from the bast fibers and after the color has been removed from them, are treated in three different baths. The first bath in which the material is treated for an average period of time lasting twenty-four hours consists of a solution of caustic soda, soda, and Marseilles soap in water. It is employed at the boiling temperature. After washing and cleansing the mass of fibers are treated for a period of twelve to fifteen minutes in a solution of chloride of lime at a temperature of 50 deg. Cent. The fibers which have been bleached and purified in this manner are then thoroughly washed and thereafter treated with a dilute solution of sulphuric acid at a temperature of 40 deg. Cent., and finally with a solution of oxalic acid at a temperature of 60 deg. Cent. The fibers are treated in this bath for a period of approximately thirty minutes and thereafter the material is washed and dried.

Weighting Silk and Detecting the Weighting

In an article in Textil Markt, 1925, number 28, page 1, there is a description of the various methods employed in the loading of silks with vegetable materials, such as gallnuts, and with mineral substances, such as iron salts and chloride of tin. A particularly high degree of loading can be secured with the aid of chloride of tin and ammonium chloride, the so-called pink salt, and in the case of silks which are to be dyed in black shades this treatment is followed by an after-treatment with a solution of tannin and iron pyrolignite.

There are in all three different principal methods of loading silk, the pure vegetable, the metallic and the mixed. The metallic loading method, which is the one employed most commonly, can be detected by the burning test. A white residue which remains after ignition of a sample of the weighted silk indicates the use of iron salts in the loading. Weighting with tannins can be detected by boiling-off with hydrochloric acid or a solution of soda and then treatment of the solution with iron salts. Weighting with sugar can be detected by the taste of the silk and also by the aid of Fehling's solution. The degree of weighting is determined by weighing the sample of silk before and after boiling out with water.

Manufacture of Piece Dyeable Mixtures from Wool and Half Wool

In the article published in Deutsche Woolen Gew., 1925, page 449, there is a description of methods of manufacturing mixtures of wool and semi-wool fabrics which are then dyeable in the piece.

The author describes first the known processes of manufacturing mixtures for dyeing. The mixtures consist in part or entirely of goods woven from animal fibers, and the dyeing is carried out with substantive cotton dyestuffs and wool coloring matters in an acid bath. In the article there are given a number of formulae which show how these operations are carried out.

It is stated in the article that for this purpose the main coloring matters that can be used are the acid dyestuffs, which are easily absorbed by the woolen fiber in neutral baths containing Glauber salt. In the case of certain coarse fabrics and striped goods with cotton warp and artificial wool weft it is necessary to add in addition to the neutral acid coloring matters certain substantive colors for the purpose of dyeing the cotton parts of the fabric. These coloring matters are well absorbed in a neutral lukewarm bath.

In order to produce black-white mixtures on half woolen coarse fabrics the cotton part of the fabric is woven into it in the white condition, while the artificial wool part consists of black fibers mixed with a corresponding number of white fibers.

Black Shades on Acetate Silk

Aromatic bases, such as alpha naphthylamine, benzidine, tolidine, diamino-diphenylamine, are brought on the fiber as such or are produced in the fiber, when, for example, emulsions in aqueous alcohol are employed. Turkey Red oil is also a very excellent emulsifying agent. The base is diazotized and then developed with beta-oxynaphthoic acid or resorcinol. The striking fact that from the same compounds according to the usual process it is possible to obtain red coloring matters, when the salts and not the free compounds are employed, can apparently be explained as follows: In each case only a comparatively slight amount of the substance is present on the fiber, while in accordance with the new process considerable larger quantites of the substance are allowed to act on the fiber, and the result is that a considerably larger quantity of coloring matter is produced.

Dyeing of Leather with Synthetic Tannins

A comparison of the dye absorbent properties of sheepskins tanned with a natural tannin, sumac, for example, and synthetic tannins, Maxyntan SS and Maxyntan KR, towards about 150 acid, basic and direct coloring matters such as are commonly used for the dyeing of leather is contained in the article published in the Journal of the Society of Dyers and Colorists, 1925, pages 308-11. The results are tabulated and analyzed.

Those coloring matters which are equally absorbed by leather tanned with Maxyntan SS or sumac cover the whole spectrum. With the exception of Ajax Acid Brown NB, acid coloring matters are unsuitable for dyeing synthetic-tanned leather in full yellow or brown shades; but brown shades can be obtained by means of Chrysoidine, easy levelling, or by dyeing first with a natural coloring matter such as Osage Orange Extract or Peachwood Extract and then topping in the same or a fresh bath with acid dyes.

For example, very level and well penetrated brown shades are obtained by dyeing leather which has been tanned with Maxyntan SS for half an hour at a temperature of 45 deg. Cent. in a bath which contains the dyewood extract and sodium dichromate (in the proportion of one-twentieth of the weight of the extract), and then adding an acid brown dyestuff and subsequently some 85 per cent formic acid, in the proportion of half the weight of the coloring matter, in order to insure exhaustion of the dye liquor. This method is specially suited for dyeing leathers intended for a velvet finish.

Deeper shades are obtained with Maxyntan KR than with Maxyntan SS with certain coloring matters, such as Orange II and several acid browns. A very cheap and convenient method for dyeing brown shades on synthetic tanned leather comprises dyeing first with brown acid coloring matters at a temperature of 45 deg. Cent., and then topping in a fresh bath with basic coloring matters at a temperature of 35 deg. Cent., both dyeings being carried out in the presence of formic acid: 0.25 to 0.5 per cent of a basic dye yields deep shades. Naphthylamine Black 4B, Acid Black HA, and Acid Blue Black are very very suitable for shading purposes and yield more level dyeings than the nigrosines. Some acid coloring matters, for example, Naphthol Yellow S, dye sumac-tanned leather, but have no affinity for synthetic tanned leather, and those dyestuffs of any class which dye synthetic tanned leather best appear to be those which contained one or more amino groups. It is suggested that in dyeing leather the tanning materials used act as the real dye absorbents.

Antiseptics Preventing Formation of Mildew

There have been many substances possessed of greater or lesser antiseptic properties which have been proposed for preventing the formation of mildew on fabrics. In the article in Melliand's Textilberichte, 1925, page 497 there is a discussion of these substances and the real effect that they have on the organism that results in mildew.

It is said therein that out of a large number of antiseptic substances, such as sulphur dioxide, sulphites, salts containing mercury, lead copper, chromium, manganese, aluminum, zinc, magnesium, arsenic and

iron, cresol, phenol and others, the only ones that are found suitable for general application to textile fabrics were formaldehyde, para-formaldehyde, salicylic acid and its salts. It was demonstrated that the fabric must contain at least one per cent of salicylic acid in order to afford satisfactory protection against mildew.

DYESTUFF TABLES

(*Continued from page* 839)

ALIZARINE BLUE SAP

(Schultz No. 858)

COMPOSITION: Derivative of anthracene.

SPECIALLY SUITABLE FOR: Wool and worsted yarn and pieces.

USUAL METHOD OF DYEING: Glauber salt and sulphuric acid.

SHADE: Slightly greener and duller than S-562.

SHADE BY GASLIGHT: Greener.

SOLUBILITY: Good.

LEVEL: Excellent.

EXHAUSTS: Perfectly.

FASTNESS TO:

Acid: To 1-10 sulphuric, good. With 28 per cent acetic, green.
Alkali: With strong alkali, goes greener.
Fulling: Inferior to Alizarine Blue BR3G.
Light: (See remarks.)
Perspiration: Poor.
Sulphur: Poor.
Washing: (See remarks.)

SENSITIVE TO METALS, LIME: Affected by iron and copper.

ON OTHER MATERIALS: Can be used for silk and also for cotton yarn with alum and sulphate of alumina mordant. It does not exhaust well, however, and is not fast to washing.

PRINTING: Can be printed on cotton with acetate of alumina (blue) or with acetate of chrome (greenish blue).

REMARKS: Alizarine Blue SAP is a pure alizarine blue having good dyeing power without a mordant; with sulphuric acid, exhausts completely. It is also as level dyeing as the best level dyeing colors on the market. In fastness to light it is better than any acid blue dyestuff and equivalent to the alizarine blues. In fastness to washing it is inferior to the alizarine blues. It has, in common with Indigo Carmine, the property of dyeing wool alone in wool-silk fabrics from a weak acetic acid bath, leaving the silk almost white. It is also suitable for bluing bleached wool. Largely used in piece dyeing in combination with Azo Fuchsine G and Alizarine Yellow 3G.

COMPETING PRODUCTS: Made in the United States by Newport Chemical Works, Inc., under name of Alizarine Blue S; Grasselli Dyestuff Corporation, under name of Alizarine Blue SAP; National Aniline & Chemical Company, under name of Alizarine Sapphire; E. I. du Pont de Nemours & Co., under name of Alizarine Saphirole B.

NEW DIAZO BROWNS INTRODUCED BY CIBA

The Ciba Company, through the distribution of Circular No. 241 to the trade, calls attention to its new Diazo Browns—Diazo Brown BW, 2GW, RW, 3RW and SW.

The most important advantage of these dyestuffs, it is claimed, lies in the fact that they can be coupled with either beta-naphthol or Yellow Developer C or toluyene diamine, so that they permit a multitude of combinations with all Diazo colors which may be developed with beta-naphthol or Yellow Developer C (for example, Rosanthrene Orange R). These dyes are said to be distinguished by their good fastness to light and washing in the piece and in yarn. The new Diazo Browns can also be used to advantage in printing, as they are dischargeable with hydrosulphite.

The new colors are shown after treatment with Yellow Developer C, beta-naphthol and toluyene diamine, so that the dyer receives existing shades with the effect of the various developers revealed. Fastness tables are also included in the circular.

NEW PONTAMINE BLUE

An entirely new color, known as Pontamine Diazo Blue 3G, has just been placed on the market by the Dyestuffs Department of E. I. du Pont de Nemours & Company.

When diazotized and developed with beta naphthol, Pontamine Diazo Blue 3G gives bright shades of greenish blue, which are said to show good fastness to light, washing, acids and alkali, and discharge easily to a good white.

It is used chiefly for the production of light and medium blues on cotton, yarns, warps, pieces, linings, etc. It also dyes readily on artificial silk, but the shades on pure silk are considerably redder than those obtained on cotton.

It may be dyed on all the usual types of machines.

INDANTHRENE YELLOW 3GF

Two folders recently issued by the General Dyestuff Corporation describe the properties of a new addition to the Indanthrene series, Indanthrene Yellow 3GF Double Paste and Powder. This new vat dyestuff is said to yield very clear greenish yellow shades of good all-round fastness. They are described as especially fast to washing, boiling soda, stoving and chlorine, apart from their resisting power when subject to bleaching with peroxide of hydrogen. This color is adapted for dyeing vegetable fibers in the loose, in the yarn or in the piece, as well as for dyeing artificial silk.

One folder exhibits the color on swatch bows, the other on printed calico piece goods. The first gives

complete dyeing instructions and the second several printing recipes.

Indanthrene Yellow 3GF Double Paste and Powder is offered jointly by Badische Aniline & Soda-Fabrik, Farbenfabriken vorm. Friedr. Bayer & Co., and Farbwerke vorm. Meister, Lucius & Bruning.

FOURTH ANNUAL MEETING OF SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS' ASSOCIATION

Members of the Synthetic Organic Chemical Manufacturers' Association gathered at the Hotel Commodore, New York City, on Friday morning, December 11th, to attend the Fourth Annual Meeting. Addresses were made during the banquet by Henry T. Claus, editor of the Boston Evening Transcript; George Eastman, of the Eastman Kodak Company; Charles D. Lawrence, Assistant Attorney General, and Dr. Charles H. Herty, president of the association.

Mr. Claus paid a tribute to the scientists and to scientific organizations for their ability to get their facts straight and make sure of their conclusions. He stated that the majority of textile manufacturers in the country were to-day using American chemicals and dyes almost entirely and that there was a disposition on their part to use nothing but domestic products.

George Eastman was elected to honorary membership in the association in recognition of the patriotic and unselfish service performed in the development of the Department of Research Chemicals of the Eastman Kodak Company.

Charles D. Lawrence said that American manufacturers are not receiving the maximum protection afforded them under the Fordney-McCumber Tariff Act. Hitherto after a tariff act had been passed and favorable rates of duty established domestic manufacturers felt that they had done all that was possible to assure protection and paid scant attention to the administration of the law. On the other hand, importers in the natural course of their business became thoroughly familiar with administrative machinery and with the steps necessary to protect their interests.

Dr. Herty spoke of the breakdown of the commercial conference held in London between English and German delegates at the request of the German Government. "We find ourselves face to face with a rather peculiar situation," he said. "We are lined up in a great commercial struggle wherein are two entirely different systems, the American where we live under the Sherman anti-trust law, and the Cartel system of subsidies and government aid, which is the German."

Officers for the coming year were elected as follows: President, Charles H. Herty; Vice-Presidents, Dyestuffs Section—August Merz, Heller & Heller & Merz; Crudes & Intermediates Section—W. F. Harrington, E. I. du Pont de Nemours & Co.; Fine Organic & Medicinal Chemicals Section—B. R. Tunison, U. S. Industrial Chemical Company; Special Chemicals Section—P. S. Rigney, Roessler & Hasslacher Chemical Company; Treasurer, F. P. Summers, Noil Chemical Company; Board of Governors: Ex-Officio, Chas. H. Herty, August Merz, W. F. Harrington, B. R. Tunison, P. S. Rigney; Dyestuffs Section—A. J. Farmer, Pharma Chemical Company; E. H. Killheffer, Newport Chemical Company; F. P. Summers, Noil Color & Chemical Company; G. H. Whaley, John Campbell Company; Crudes and Intermediates Section—W. S. Weeks, Calco Chemical Company; T. W. Sill, E. C. Klipstein Company; S. W. Wilder, Merrimac Chemical Company; Fine Organic and Medicinal Chemicals Section—R. E. Dorland, Dow Chemical Company; A. S. Burdick, Abbott Laboratories, Chicago; Special Chemicals Section—A. V. H. Mory, Bakelite Corporation; Honorary member, William Eastman.

Exports of American manufactures to China show an enormous increase since 1914, when the non-manufacturing world was drawing most of its manufactures from Europe. With the war activities in Europe and the difficulties of transportation on the Atlantic the non-manufacturing world, says the Trade Record of the National City Bank of New York, found it more convenient to obtain its supplies of manufactures from the United States, which could send them across the peaceful Pacific, and as a result our exports of manufactures to China have grown from 22 million dollars in the year preceding the war to 84 million dollars in the calendar year 1923, the latest date for which details are available, and manufactures in that year formed 77 per cent of our exports to China.

The plant of the Stewart Dyeing Company, Rochester Street, Salamanca, N. Y., was recently acquired at a public auction sale by Frank H. Mott, Jamestown, N. Y., on a bid of $18,500. Mr. Mott purchased the local plant of the Ashworth-Odell Worsted Company, several months ago, also at a public sale.

POSITION WANTED

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DYESTUFF OR CHEMICAL SALESMAN

Young man, graduate in chemistry of North Carolina State College, who has had extensive experience in dyestuff application laboratories and cotton mills, desires an opportunity to sell dyestuffs or other chemicals. Address Box 322, American Dyestuff Reporter.

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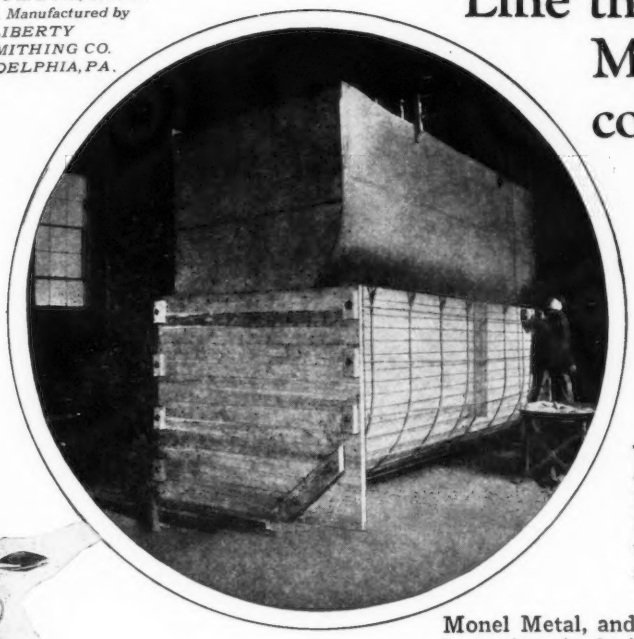

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